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THE BUILDERS'
JOURNAL

AND ARCHITECTURAL RECORD

APPEALING TO THOSE ENGAGED IN

THE ART OF BUILDING.

*IT is our aim, our ambition, our aspiration even,
to build our Journal worthily and well, not
for the hour only, but for future years; for the
few men in the forefront of an enduring and
a laborious Art; for the disciplined ranks of a
distinguished Profession; for the young men—
Architects to be—and for all who love a clustered
column or a flying buttress, a traceried window
or a Greek frieze; for the man, too, who honestly
plumbs a jamb*

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CONTENTS.

ABBEY: Bath, 241; Croyland, 108; Tintern, 114; Westminster, 294.
Aberdeen, North U.F. Church, 177.
Accidents, Building, 18, 161.
Acoustics, 87, 103, 152.
Act, London Building, 255, 257, 270, 330, Supp. Dec. 21st, p. 32.
Adjoining Owners, Rights of, 266, 343.
Admiralty, Assistant Surveyor Examination, 22.
Africa, South: Architecture and Building in, 235; Building Trade in, 87; "Building News and Contractors' Journal," 267; Cost of Building in, 239.
Air of the City Temple, London, 254.
Air-space, 103, 153.
Algeria, Roman Architecture in, 148.
Algerian Onyx, 126.
Amateur Restorers, 133.
America, Registration in, 82.
American: Architects' Charges, 80; Building Methods, 184, 235; Structural Steelwork, 273; Students at the Beaux-Arts, Paris, 81.
Amplthill Infectious Diseases Hospital, 129.
Ancient Building Construction, Choisy's Researches in, 329.
Ancient Lights, 44, 295.
Animals, House for, at Zoo, 136.
Antwerp Petroleum Blaze, Supp. Nov. 23rd, p. 12.
Arch, Trabeated, 36.
Architect, Action for Negligence against, 239, 266.
Architects: Assistants: 42; in South Africa, 138; under Government, 326; Charges, 37, 75, 80, 246, 267, 336; of Ireland, 336; Liability for Goods Supplied, 9; for Municipal Work, 311; Ownership of Drawings, 326; Registration, 23, 82; Royal Institute of British, 46, 51, 167, 251, 275, 309, 322, 330; Society of, 222, 276.
"Architecture," 226.
Architecture: and Building Construction, 266; and Building in South Africa, 235; Byzantine, 306; Drawings of, 54, 188, 213, 230; Early Decorated, at Oxford, 9; in Eastern Europe, 318; Lancet Period of English, 303; Nathaniel Hawthorne and, 11; Roman, in Algeria, 148; Romanesque, in England, 240; Street, 340.
Architectural Association, 76, 94, 175, 203, 261, 293, 317; of Ireland, 230; and Building Events of 1904, Supp. Dec. 28th; Fitment of Ships, 202; Modelling, 37, 226; Northern, Association, 291; Novel, 326; Partnerships, 101; Photography, 203; Reflections, 317; School at Cambridge, 288.
Articles, 240, 280.
Asbestos, Finland, 110.
Assessment: Building, 305; of Brickfields, 166.
Assistants: Architects', 42, 226; Estate Agents', 307.
Association: Architectural, 76, 94, 175, 203, 261, 293, 317; British, 99, 110, 117; Northern Architectural, 291.
Athens: Erechtheum, 42, 75; Parthenon, 75.
Australia, West, Railway Scheme, 215.
Authorities, Local, Drawings required by, 280.
Awards, Party-wall, 37.
Aylesford Bridge, 133, 167.

BAGATELLE, Paris, 23.
Baltimore Fire, 15, Supp. Nov. 23rd, pp. 7, 11.
Barrage of the Thames, 117.
Bath, Swimming, in Basement, 245.
Bath: Abbey, 241; Stone Quarries, 170.
Baths: Birmingham, 6; New Brompton, 72.
Battens, Slatting, Bundling, 102.
Beams, Ferro-concrete, Tests on, 193.
Beaux-Arts, Paris, American Students at, 81.
Bedford, Francis W., 322.
Bedrooms, Lavatory Basins in, 76.
Beni-Hasan, Discoveries at, 6.
Bequest, Chantry, 89.
Birmingham: Baths Competition, 6; Welsh Water-supply, 35.
Blinds and Shutters, 25.
Blocks, Peat, for Building, 102.
Board of Works, Irish, 87.
Boat, Fire and Salvage, Supp. Dec. 21st, p. 32.
Books: Geometry, 37, 240; Illuminating, 87; Inns of Essex, 87; Mortuaries, 118; Ornament, 119; Fletcher's History of Architecture, 145; Refuse-disposal, 209; Physics and Chemistry, 240; Heating and Hot Water, 240; Sanitary Work, 240; Technical Arithmetic, 240.
Bradford, Sewage Work at, 238.
Brewery, Dublin, 274.

Brick: Cartage, 45; Partitions, Fireproof, 104; and Tile Making, 331, 341.
Bricks from Clinkers, 156.
Bricks and Mortar, 6, 23, 35, 47, 58, 70, 89.
Brickfields, Assessment of, 166.
Brickmaking, 199.
Bridge: Articulations of, 170; Aylesford, 133, 167; Exeter, 58; London, 25, 121, 231; Purfleet, 247.
British Association, 99, 110, 117.
British Measures, Standardized, 93.
Brixton School of Building, 212.
Brompton, New, Baths, 72.
Buenos Ayres, Hippodrome, 183.
Builder: Right of, to take away Men, 22; Topical, 229.
Builders: Directory of, 121, 147, 174, 215; Exchange, 147; Insurance against Compensation, 88; Office Staff, 131.
Builders' Notes, 12, 38, 50, 58, 78, 92, 105, 118, 131, 142, 167, 178, 199, 210, 220, 234, 247, 260, 276, 287, 303, 316, 335.
Building: Accidents, 18; Act, London, 255, 257, 270, 330, Supp. Dec. 21st, p. 32; and Architectural Events of 1904, Supp. Dec. 28th; Methods, American, 184, 235; Assessments, 308; Blocks of Peat, 102; By-laws, 107, 119, 192, 269, 279, 330; Construction, 201, 221, 266, 329, BUILDERS' JOURNAL Articles on, 75; Directories, 76; Drain under, 280; French, Law in Canada, 54; Medieval, 102; House, in Persia, 293; Prices, 20; L.O.C. School of, 212; Strike in New York, 152; Sites, L.O.C., 65; Surveyor, 289; in new Street with Narrow Entrance, 225; in the Tropics, 143; Trade Employers, 61; Trade in South Africa, 87, 234; Trade Workmen, 93.
Buildings: Government, 45; Johannesburg, 235; Manchester, 2; Modern London, 158, 168, 199; to Measure, see "Measure"; Societies for Preservation of, 102, 117; Supervision of, 27; Temporary, in Gardens, 209.
By-laws: Buildings, 107; Rural, 119, 269, 279, 330; Model, 192.
Byzantine Architecture, 306.

CANADA: French Building Law in, 54; Work in, 100.
Card, Indexes, 118.
Cardboard, Architectural Modelling in, 37, 226.
Carlisle Theatre Fire, Supp. Nov. 23rd, p. 2.
Carpentry and Joinery, 119, 239.
Cartage, Brick, 45.
Cast-iron Columns: Formula for, 226; Safe Load on, 265, 307.
Castleford, Buildings to measure around, 9.
Cathedral: Lhasa, 182; Liverpool, 10, 39, 75; Uganda, 89.
Cathedrals, English, Descriptions and Lantern Slides of, 321.
Cellar, Water in, 280.
Celluloid Fire, Paris, Supp. Nov. 23rd, p. 13.
Cement: Calcining, Temperature of, 126; Combine, 169; Irish, 102; Portland, 139, 154; Sorel, 305; Works, 9.
Chantry Bequest, 89.
Chapel, King's Sanatorium, 305.
Charges, Architects', 37, 75, 80, 246, 267, 336.
Charing Cross, London, Bridge at, 25.
Chatham, Buildings to measure around, 44.
Chelsea Pumping Stations, 35.
Chicago, Underground Traffic Tunnels, 188.
Chimney: Draught, 56; Liability for Smoky, 280.
Choisy's Researches in Ancient Building Construction, 329.
Church: Corstorphine, 329; Doomed City, 47; North U.F., Aberdeen, 177.
Churches: City, 118; Essex, 42; Pearson's, London, 343.
City Churches, 47, 118.
City Temple, London, Air of, 254.
Classes in Quantities, Joinery, &c., 169.
Clinkers, Bricks from, 156.
Closets and Sewers, Liability for, 307.
Coastguard Stations, 307.
Coliseum: London, 218, 242, 312; Rome, 40.
College, Glasgow Technical, 206.
Colleges, Oxford, 230.
Cologne, Fire Station, Supp. Nov. 23rd, p. 16.
Colonies, Openings for Architectural Assistants in, 43, 118.
Column for Shop Front, Triangular, 225.
Columns, Cast-iron, 226, 265, 307.
Commission, Tariff, Report on Iron and Steel Trades, 41.
Compensation: Builders' Insurance against, 88; Workmen's, 69.

Competition: Birmingham Baths, 6; Foreign, in Girders, Beams and Pillars, 41; Local Architects or, 201; National, 53; Photographic, 131; "Uralite," 224.
Concert Hall, Roof for, 87, 103.
Concrete: Ferro, 85, 193, 275, 303, Supp. Dec. 21st, p. 17; Floor Test, Supp. Nov. 23rd, p. 15; Railway Viaduct, 337.
Construction, Building, B.J. Articles on, 75.
Construction Notes, 102, 110, 126, 143, 156, 170, 179, 196, 238.
Continent, Municipal Engineering on the, 281.
Contract, Dispute about a, 239.
Contractors: Municipalities as their Own, 79; Trolly, 132.
Corelli, Marie, on Restoration, 47.
Cornice on Wall, 62.
Cornwall, White Rough-cast for, 192.
Corroders Courts and Public Mortuaries, 162, 180.
Correspondence: Liverpool Cathedral Foundations, by Thomas Pritchard, 10; The Tomb of Nicholas Hawksmoor, by Edward Crosby, 31; Buildings to measure around Llandudno, by C. O. N., 45, by James R. Wigfull, 77; Underpinning Party-walls, by W. Blain, 77; Acoustics, by W. K. Booth, 152; Schoolroom Dadoes, by C. F. A. Voysey, 152; American Building Methods, by James A. Smyth, 184, by H. Hems, 235; The Savoy and the Gaiety, by Onlooker, 185; Teaching of Building Construction, by J. Bartlett, 221; Architecture and Building in South Africa, by H. James, 235; Mortuary Fittings, by E. R. Caven, 265; Exeter's Old Guildhall, by H. Hems and Thackeray Turner, 319.
Corstorphine Church, Roofs of, 329.
Cottage: £150, 187; Exposed End of, 307.
Cottages: Cheap, 269, 279, 297; Rural, 343; Stratford-on-Avon, 253.
Courtyard, What is a Central, 225.
Croyland, 108.
Cylinder Foundations, 126.

DADOES FOR SCHOOLROOMS, 152.
Damage caused by Storm, Liability for, 225.
Damp: Rooms, 37; Walls, 62, 321.
Damp-resisting Paint, 37.
Damp-resister, 131.
Deadening Sound, 76.
Decorated, Architecture at Oxford, 9.
Decration: English, at St. Louis Exhibition, 221; Modern, 220.
Design, Experiment in Teaching, 201, 221.
Destructor Residuals, Utilization of, 63.
Directory of Builders, 121, 147, 215.
Directories, Building, 76.
Discoveries: at Beni Hasan, 6; in Egypt, 99.
Doors in Hospitals, 228.
Drains: Combined, 10; New, 246, 265; under Buildings, 280.
Draught, Chimney, 56.
Drawings: Architects' Ownership of, 326; of Architecture, 54, 188, 213, 230; for Reproduction, 321; Photo-Copies of, 112; required by Local Authorities, 280.
"Drenchers," City Warehouse, Supp. Nov. 23rd, p. 11.
Drill Halls, 209.
Dry-rot, 37, 192, 239, 246, 307, 343.
Dublin Brewery, A new, 274.
Dustless Roads, 301.

EGYPT: Discoveries in, 99; Nile Dam and Submerged Temples, 283.
Electric Lighting, Germany, 281.
Electrical Notes, 210, 333.
Electricity Station, West Ham, 56.
Ely, 326.
Engines, Oil and Gas, Failures of, 32.
Engineer, The Borough, 226.
Engineers: Institute of Sanitary, 51; Junior Institution of, 156, 251, 251; Society of, 9, 179.
English: Architecture, Lancet Period of, 303; Cathedrals, Description and Slides of, 321; House, 14.
Enquiries Answered: Acoustics, Concert Hall, 87, 103; Adjoining Owners, Rights of, 266, 343; Admiralty, Assistant Surveyor, 22; Africa, South: Cost of Building in, 239, "Building News and Contractors' Journal," 267; Air Space, 103, 153; Ancient Lights, 44, 295; Arch, Trabeated, 36; Architect, Action for Negligence against, 239, 266; Architects' Assistants: 42, in South Africa, 118, under Government, 226; Architects' Charges,

37, 75, 246, 267; Architects' Liability for Goods Supplied, 9; "Architecture," 226; Architecture: Early Decorated, at Oxford, 9, and Building Construction, 266, Architectural Modelling, 37, 226; Articles, 240, 280; Assessments, Building, 305; Assistants: Architects', 42, 226, Estate Agents', 307; Athens: Erechtheum, 42, 75, Parthenon, 75; Books: Geometry, 37, 240, Illuminating, 87, Inns of Essex, 87, Mortuaries, 118, Ornament, 119, Fletcher's History of Architecture, 145, Refuse-disposal, 209, Physics and Chemistry, 240, Heating and Hot Water, 240, Sanitary Work, 240, Technical Arithmetic, 240; Builders' Insurance against Compensation, 88; Builders' Office Staff, 131; Builders' Right to take away Men, 22; Building Construction Articles, 75; Building in new street with narrow entrance, 225; By-laws: Model, 192, Rural, 119; Card Indexes, 118; Carpentry and Joinery, 119, 239; Cathedrals: English, Lantern Slides of, 321; Cellar, Water in, 280; Cement, Sorel, 308; Chimneys, Smoky, 280; Churches, City, 118, Essex, 42, Pearson's, London, 343; Closets and Sewers, 307; Coastguard Stations, 307; Colonies, Openings for Architectural Assistants, 43, 118; Columns, Cast-iron, 226, 265, 307, Triangular, 225; Contract, Dispute about, 239; Cornice on Wall, 62; Cottage, Exposed End of, 307; Courtyard, Central, 225; Damage caused by Storm, 225; Damp: Rooms, 37, Walls, 62, 321; Damp-resister, 131; Damp-resisting Paint, 37; Directories, Building, 76; Drains, 10, 246, 265, 280; Drawings: for reproduction, 321, required by Local Authorities, 280; Drill Halls, 209; Dry-rot, 37, 192, 239, 246, 307, 343; Engineer, Borough, 226; Erechtheum, 42, 75; Essex Churches, 42, Inns, 87; Estate Agents' Assistants, 307, Fees for laying-out, 246; Examinations: Assistant Surveyor, Admiralty, 22, War Office, 265, R.I.B.A., 37, 226, 239, 265, 307, 343, Sanitary Inspectors, 145, South Kensington, 226; Exhibition, Building Trades, 225; Ferro-concrete, 62; Fireclay Stove, 37; Fixative for Pencil Sketches, 267; Footings, Cutting Away, 307; Furniture and Decoration, 145; Gardens, Temporary Buildings in, 200; Gauge for Sheet Lead, 295, 308; Geometry, 37, 240; Glazing, Patent, 184; Gloucestershire, Tour through, 43; Gymnasium Roof, 266; Heating Apparatus, 76; Income Tax and Mortgage, 131; Indenture, Pupil's, 280; Irish Board of Works, 87; Kensington Palace, Orangery, 295; Lead-lined Iron Pipes, 22; Lavatory Basins in Bedroom, 76; Lectern, Classic, 118; Liability: Architect's, for Goods supplied, 9, for new Closets and Sewers, 307, for Smoky Chimneys, 280, for new drains, 246, 265, for road, 183, 192, 239, for damage done by storm, 225; Library planning, 145; Light Wells, 307; Lightning Conductor over Window Frame, 227; Lime: for road, 307, slaking, 184; Liverpool Cathedral, 75; Lobby, definition of, 240; Market-place on Girders and Concrete, 266; Measure, Buildings to: around Castleford, 9, on South Coast, 22, near Cambridge and Llandudno, 37, in Gloucestershire and Oxfordshire, 43, around Pwllheli, Swanage and Chatham, 44, around Peterborough and Mold, 75, in South Wales, 88, in South-east London, 169, for R.I.B.A. Final Examination, 226, around Nottingham, 267; Measure, How to, 37; Miserere, Strange, 131; Mortar, Testing, 192; Mortgage and Income Tax, 131; Motor Car Sheds, 226; Oak: Harmonizing Mahogany and, 226, Renovating Gates and Posts, 183, Removing Plaster on Panel, 43; Office of Works, 22; Overlooked Premises, 44; Oxford, Early Decorated Work at, 9; Oxfordshire, Tour through, 43; Paintwork, Measuring, 226; Parchment, Colouring on, 184; Party-wall Awards, 37; Patents, 22, 209; Pipes, Flow of Water in, 183, lead-lined iron, 22; Plaster-cast of Ornament, 209; Preservation of Old Buildings, Societies for, 103; Profession to take up, 76; Pumps, 169; Quantities: Classes in, 169, Item in, 209; Quantity Surveying, 170, 226; Road: Gas-lime for, 307, Liability to make, 183, 192, 239; Payment for, 343; Roof: Damp Room in, 37, for Concert Hall, 87, 103, Damage done by Storm to, 225, Dry-rot in, 246, Hip, 321, Tiles, 9, Trusses, 131, 266, 280, 321; Rooms for "Human Habitation," 170; Rough-cast, 192, 280; Rubbings, Tomb Stone, 44, 239; Sashes, Sliding, 131; Sewers: and Closets, 307, connections to, 43; Shop-girder, 307; Slatting,

239; Sessions House, London, 22; Sorel Cement, 308; Sound-deadening, 76; Surveyors: Assistants, Admiralty, 22; Work approved and condemned by, 227; Swimming Bath in Basen, 245; Tender, Acceptance of Lowest, 245; Thrust, A Question of, 192; Tiles, 9; Timber, 307; Town Halls, 280; Valuation of Property, 246; Volute, Drawing, 75; Water: in Celler, 280, Flow in Pipes, 183, Mains, 267, Supply, 103, 153.

Erethnum, 42, 75.

Erosion, Sea-coast, 179.

Essex: Churches, 42; Inns, 87.

Estate: Agents' Assistants, 307; Fees for Laying-out, 246.

Events of 1904, Building and Architectural, Supp. Dec. 28th.

Examinations: Assistant Surveyor, Admiralty, 22; War Office, 265; for Sanitary Inspectors, 145; R.I.B.A., 37, 46, 226, 239, 265, 307, 322, 343; South Kensington, 226.

Excavation of Herculaneum, 326.

Exchange, Builders', 147.

Excursion to Sherborne, A.A., 94.

Exeter: Guildhall, 319; New Bridge, 58.

Exhibition: Building Trades, 225; of Cheap Cottages, 297; International Fire, Earl's Court, Supp. Nov. 23rd, p. 10; St. Louis, 221, 284.

Experiment in Teaching Design, 201, 221.

Explosion, Gas, Bloomsbury, London, Supp. Dec. 21st, p. 29.

Europe, Architecture in Eastern, 318.

FACTORIES, Ventilation of, 64.

False Rail Ventilation, 50.

Farmhouse, Water Supply to, 103.

Ferro-concrete: 85, 275, 309; and Fire Protection, Supp. Dec. 21st, p. 17; Beams, Tests on, 193; Lighthouse, 156; Pier, at Purfleet, 247.

Fever Hospitals, 268.

Finland Asbestos, 110.

Fireclay Stove, 37.

Fire: Protection on Board Ship, Supp. Nov. 23rd, p. 14; Congress, Budapest, same Supp. p. 14; Station at Cologne, same Supp. p. 16; Protection and Armoured Concrete, Supp. Dec. 21st, p. 17; Risks in Large Shops and Stores, same Supp. p. 18; Insurance Plans, same Supp. p. 24; Hamburg Oil, same Supp. p. 28; Risks on Electric Underground Railways, same Supp. p. 30; Service, same Supp. p. 31; and Salvage Boat, same Supp. p. 32.

Fires: Carlisle Theatre, Supp. Nov. 23rd, p. 2; Sandringham, same Supp. p. 2; Buchanan Street, Glasgow, same Supp. p. 2; Baltimore, 15, Supp. Nov. 23rd, pp. 7, 11; Toronto, same Supp. p. 8; Temperatures at Great, same Supp. p. 11; Antwerp Petroleum, same Supp. p. 12; Paris Celluloid, same Supp. p. 13; Budapest, Supp. Dec. 21st, p. 18; Red Lion Market, London, same Supp. p. 23; Metropolitan Railway, Paris, 328, same Supp. p. 31.

Fireproof: Brick Partitions, 104; Materials, Fictitious Materials, Supp. Nov. 23rd, p. 4; Partitions, 38.

Fireproofing, 83.

Fire-resisting Wood, 110.

Fixative for Pencil Sketches, 267.

Floor: Fungus in, 192, 239; Terra-cotta, Test with, Supp. Nov. 23rd, p. 10.

Flow of Water in Pipes, 183.

Footings, Cutting away, 307.

Foundations: Cylinder, 126; Liverpool Cathedral, 10.

French Building Law in Canada, 54.

Frescoes, Watts's, 1.

Fungus, Dry-rot, 37, 192, 239, 246, 307, 343.

Furniture and Decoration, 145.

GALVANIZING, New Process of, 156.

Gardens, Temporary Buildings in, 209.

"Gas-steam" Radiator, 337.

Gas Explosion, Bloomsbury, London, Supp. Dec. 21st, p. 29.

Gas Lime for Road, 307.

Gas and Oil Engines, Failures of, 32.

Gate Lodge at Glasgow University, 134.

Gauge for Sheet Lead, 295, 308.

Geometry, 37, 240.

Germany: Old Towns of, 117; Regulations for Reinforced Concrete in, 85; Water-Supply, Sewerage and Lighting, 281.

Girder over Shop Front, 307.

Girders, Beams and Pillars, Foreign Competition in, 41.

Glasgow: Fire in Buchanan Street, Supp. Nov. 23rd, p. 2; Hospitals, 155; Gate Lodge at University, 134; Sanitary Development of, 63; Technical College, 206.

Glass, Strength of, 143.

Glazing, Patent, 184.

Gloucestershire, Tour through, 43.

Granolithic Roofs on Corstorphine Church, 329.

Grantham, Justice, and Rural Housing, 174, 279, 343.

Grates, Cast-iron, 77.

Greek Sites, 135.

Government: Architects' Assistants under, 226; Buildings, 45.

Guildhall, Exeter, 319.

Gymnasium, Roof-Trusses for, 266.

HALL: Drill, 209; Roof for Concert, 87, 103; Royal Horticultural Society's, London, 47; Town, 280.

Hamburg: New Warehouses at, Supp. Dec. 21st, p. 26; Oil Fire, same Supp. p. 28.

Hanover and Hildesheim, 80.

Hawkesmoor, Tomb of, 31.

Hawthorne, Nathaniel, and Architecture, 11.

Heating, 52, 176.

Hennebique Concrete Construction, 62.

Herculaneum Excavation of, 326.

Hildesheim and Hanover, 80.

Hippodrome, Buenos Ayres, 183.

Hoisting and Scaffolding, 125.

Horner, P. Morley, 256.

Horticultural Society's Hall, London, 47.

Hospital: for Infectious Diseases at Ampthill, 129; for Women, Wolverhampton, 122; Upton Isolation, 174; Rotherham Infectious Diseases, 70.

Hospitals: Doors in, 228; Fever, 268; Glasgow, 153.

Hotel: Ritz, 165, 235, 284; Savoy and Gaiety, 185.

House: for Animals at Zoo, 136; Building in Persia, 293; English, 14; Fronts, Stability of, 126.

Houses: Open Spaces around, 103; Motor Car, 68, 226.

Housing: Municipal, 63, 99; Rural, 174, 297.

"Human Habitation," Rooms for, 170.

Hydraulic Rams, 90.

ILLUMINATING, Book on, 87.

Income Tax and Mortgage, 131.

Indenture, Pupils', 280.

Indexes, Card, 118.

Infirmity, Manchester Royal, 8.

Inns of Essex, Book on, 87.

Inspectors, Sanitary, 64, 145.

Instructors, Technical, 201.

Institute, Royal Sanitary, 63, 67, 268.

Insurance: Builders', against Compensation, 88; Fire Plans, Supp. Dec. 21st, p. 24.

Invitation, An, 133.

Iona, Restoration of, 39.

Ireland: Architectural Association of, 230; Royal Institute of the Architects of, 336.

Irish: Board of Works, 87; Cement, 102.

Iron, Strength of, 143.

Ironwork, Foreign Competition in, 41.

JOHANNESBURG, Buildings in, 295.

KENSINGTON PALACE, Orangery, 295.

Keystones, 10, 24, 34, 48, 74, 88, 104, 116, 130, 144, 159, 172, 185, 195, 207, 224, 240, 248, 259, 278, 292, 308, 334, 340.

King's Sanatorium, Chapel at, 305.

LAMBETH BRIDGE, 231.

Lamination of Tiles, 196.

Lancet Period of English Architecture, 303.

Language, New, for Architects and Builders, 241.

Lantern Slides of English Cathedrals, 321.

Lavatory Basins in Bedrooms, 76.

Law Cases: Quantities and Lump Sum Contracts, 8; Is a Chimney-pot part of a House? 8; Railway Contractors' Claim for Extra Work, 35; Edinburgh Architects' Claim for Fees, 46; Light and Air Case—*Kine v. Jolly*, 73; Successful Claim for Fees, 73; Building blown in by Gale, 74; Workmen's Compensation Case, 74; Fees for Plans, 92; Arbitration Enquiry, 92; Erection of Party-wall, 92; A Question of Trade Custom, 108; Air-space around Houses, 178; Bats for Bricks, 178; Sanitary Inspectors' Mistakes, 197; A Preposterous Summons, 210; When is a Building Complete? 231; Abortive Action for Libel against the "Contract Journal," 231; Sewers on a Building Estate, 254; Mr. Alcott's Appeal Dismissed, 268; Compulsory Acquisition of Land by Councils, 277; Drain or Sewer, 277; Ownership of Plans, 277; Action against an Architect for Alleged Negligence, 306; Ancient Lights Appeal Case—*Kine v. Jolly*, 328; Employers' Regulations, 328; Plans of Rural Cottages, 343.

Lead: Joints, Substitute for, 156; Lined Iron Pipes, 22; Gauge for Sheet, 295, 308.

Leaderettes: Mr. Watts's Frescoes, 1; The Soane Curatorship, 13, 25; Padua, 13; Shutters and Blinds, 25; New Bridge at Charing Cross, 25; Newspaper Criticism of Liverpool Cathedral, 39; Why restore Iona? 39; Students' Work at South Kensington, 53; L.C.C. Building Sites, 65; Municipalities as their own Contractors, 79; Men by the Thousand, 93; Standard British Measures, 93; Absurd Building By-Laws Again, 107; A New Thames Bridge, 121; A Directory of Builders, 121, 147, 174, 215; An Invitation, 133; Amateur Restorers, 133; Aylesford Bridge Threatened, 133; A Builders' Exchange, 147; Walbeck-Rousseau's Waistcoat, 147; Sessions House Accident, 161; Plenum Ventilation, 161; No Judge of Architecture, 174; The £150 Cottage, 187; The Victoria Memorial, 187; To Associate Technical Instructors, 201; Local Architect or Competition, 201; Experiment in Teaching Design, 201; Scamps in the New York Building Trade, 215; A Project of Imperial Interest, 215; Traffic Subways, 229; New Privilege for Readers, 229; The Topical Builder, 229; Protection and Repair, 241; New Language for Architects and Builders, 241; Our New Fire Supplement, 255; The London Building Act, 255; Sir Aston Webb, 255; Picking Steel, 255; Decay of Stone, 269; The Deputation to Mr. Long, 269; The Nile Dam and Submerged Temples, 283; An Exhibition of Cheap Cottages, 297; No. 17, Fleet Street Again, 297; Architects for Municipal Work, 311; An Excavation of World Interest, 326; Ownership of Drawings, 326; An Architectural Novel, 326.

Lectern, Classic, 118.

Leeds and Yorkshire Architectural Society, 280, 329.

Leeds Railway Roofs, 19.

Letter-writer, Newspaper, 103.

Lhasa Cathedral, 182.

Liability: A Architect's, for Goods Supplied, 9; for New Closets and Sewers, 307; for Smoky Chimneys, 280; for New Drains, 246, 265; for Road, 183, 192, 239; for Damage to Roof caused by Storm, 225.

Library Planning, 145.

Light Wells, 307.

Lights, Ancient, 44, 295.

Lighting, 179.

Lighthouse, Ferro-concrete, 156.

Lighting: Conductors, 157, 227; Effects of, 110.

Lime: Gas for Road, 307; Slaking, 184.

Liverpool: Architectural Society, 220; Cathedral, 10, 39, 75.

Llandudno, Buildings to measure around, 37, 45, 77.

Lobby, Definition of, 240.

Local Authorities, Drawings required by, 280.

Lock-outs and Strikes in 1903, 7.

London: Air of the City Temple, 254; Barrage of the Thames, 117; Bloomsbury Gas Explosion, Supp. Dec. 21st, p. 29; Buildings to measure in South-East District, 169; Building Act Bill, 255, 257, 270, 330, Supp. Dec. 21st, p. 32; Bridges, 25, 121; Chelsea Pumping Stations, 35; Coliseum, 218, 242, 312; City Churches, 47, 118; City Warehouse "Drenchers," Supp. Nov. 23rd, p. 11; County Council, 267, 281, 309; County Council Building Sites, 65; County Council School of Building, Brixton, 212; Fire Exhibition, Earl's Court, Supp. Nov. 23rd, p. 10; Fire in Red Lion Market, Supp. Dec. 21st, p. 23; Lord Mayor on Fire Service, same Supp. p. 31; No. 17, Fleet Street Again, 297; Narrow Shop in Fleet Street, 89; New Government Buildings, 45; Ritz Hotel, 165, 235, 284; Orangery, Kensington Palace, 295; Modern Buildings, 158, 168, 199; Mosque, 171; Pearson's Churches, 343; Photo-Printing Works, Westminster, 335; New Post-Office for Northern District, 253; Royal Horticultural Society's Hall, 47; Sessions House, 22, 161; Timber Market, 137, 190, 320; To-day, 97; New Victoria Station, 47; Victoria Memorial, 187; Westminster Abbey, 294; Excavations at Westminster, 294; House for Animals at Zoo, 136.

Lotus Ornament, Evolution of, 99.

MACADAM, How he made his Roads, 254.

Machine: for Testing Full-sized Members, 110; Notching, 119.

Madeleine, Paris, Architect of, 109.

Mahogany and Oak, Harmonizing, 228.

Manchester: Fire and Salvage Boat on Ship Canal, Supp. Dec. 21st, p. 32; New Buildings in Trafford Park, 302; Old Buildings in and around, 302; Royal Infirmary, 8; Sewage System, 67; Society of Architects, 35, 207.

Market-Place on Girders and Concrete, 268.

Material, New Use of an Old, 232.

Materials, Fictitious Fireproof, Supp. Nov. 23rd, p. 4.

Measure, Buildings to: around Castleford 9; on South Coast, 22; near Cambridge and Llandudno, 37, 45, 77; in Gloucestershire and Oxfordshire, 43; around Pwllheli, Swanage and Chatham, 44; around Peterborough and Mold, 75; in South Wales, 88; in South-East London, 169; for R.I.B.A. Final Examination, 226; around Northampton, 267.

Measure, How to, 37.

Measures, British, Standardized, 93.

Measuring Paintwork, 226.

Medieval Building, 102.

Memorial, Victoria, 187.

Men who Build: E. Thornton, 298; Mr. Pecksniff, junr., 339.

Misere, A Strange, 131.

Model By-Laws, 192.

Modelling Architectural, 37, 226.

Modern: Cement Works, 8; Decoration, 220.

Mold, Buildings to measure around, 75.

Mortar, Test for, 192.

Mortgage and Income Tax, 131.

Mortuary Fittings, 268.

Mortuaries: Book on, 119; and Coroners Courts, 162, 180.

Mosque for London, 171.

Motor: Houses, 68, 226; Municipal Wagons, 63.

Municipal Work, Architects for, 311.

Municipalities as their own Contractors, 79.

NAUTICAL SCHOOL, Portishead, 35.

Negligence, Action for, Against Architect, 239, 266.

New Brompton, Baths, 72.

Newspaper Letter-writer, 109.

New York Building Trade, 152, 215.

New Zealand, Openings for Architectural Assistants in, 43.

Nile Dam and Submerged Temples, 283.

Northampton, Buildings to measure around, 267.

Northern Architectural Association, 291.

Notching Machine, 119.

Novel, An Architectural, 326.

OAK: and Mahogany, Harmonizing, 226; Gates and Posts, Renovating, 163; Panel, Removing Plaster on, 43.

Obituary: Peter Bibby, 19; Thomas Browne, 19; Thomas Smith, 19; J. Athron, 19; W. H. Rawley, 51; A. Hillier, 70; W. E. Mitchell, 70; Frank M. Kent, 70; S. Briant, 84; J. S. Stewart, 84; G. Lynn, 84; J. Norris, 84; W. T. Liddiard, 103; T. Wellman, 103; E. A. Lansdowne, 103; W. Hudson, 109; Col. C. Ellison, 109; A. M. Thomson, 109; J. H. Peters, 125; J. Bodley, 125; F. Rendell, 125; J. Mastin, 125, 197; J. Mitchell, 136; J. Taylor, 136; D. Hughes, 136; H. Ford, 136; Sir James Steel, 136; J. Sellers, 136; C. S. Cording, 169; G. A. Lawson, 169; C. J. Little, 169; N. Brookes, 197; J. Hibbert, 197; J. Coates, 197; M. Bartholdi, 197; T. Lea, 213; W. Moorhouse, 213; H. Gray, 223; H. Hewitt, 223; T. V. Davison, 223; Prof. Kerr, 224; W. Ludlam, 240; D. B. Alley, 240; F. Smith, 240; C. Foulsham, 253, 281; W. Topliss, 253; B. T. Batsford, 253, 267; W. H. F. Sames, 253, 281; R. Hardy, 253; W. H. Handover, 267; T. Boyce, 267; A. R. Gough, 267; H. Muir, 281; W. H. F. Sames, 281; F. W. Moulson, 281; J. Norton, 281; G. H. Holt, 292; W. Freeman, 292; Dr. G. Vivian Poore, 292; J. Cumberland, 308; E. Hobbs, 308; C. J. Ferguson, 308; F. W. Bedford, 308, 322; W. Mason, 334; J. A. McDonald, 334; R. Mawson, 334; W. Dart, 334.

Ochres, 143.

Office of Works, 22.

Oil Fire, Hamburg, Supp. Dec. 21st, p. 28.

Oil and Gas Engines, Failures of, 32.

Onyx, Algerian, 126.

Operations, Building Trade, 93.

Orangery, Kensington Palace, 295.

Ornament: Book on, 119; Lotus, Evolution of, 99; Plaster Cast of, 209.

Overlooked Premises, 44.

Owners Adjoining, Rights of, 266, 343.

Oxford: Colleges, 230; Early Decorated Work at, 9.

Oxfordshire, Tour through, 43.

PADUA, 13.

Paint, Damp-resisting, 37.

Paints, Durability of, 126.

Painting Wood, 143.

Paintwork, Measuring, 226.

Panel, Oak, Removing Plaster on, 43.

Papers Read: Notes on the Supervision of

Buildings, by O. F. Innocent, 26; French Building Law in Canada, by S. G. Archibald, 54; Chimney Draught, by Walter Yates, 66; Municipality and Plumber, by R. Crawford, 63; Municipality and Housing, by Sir Samuel Chisholm, 63; Municipal Motor Wagons, by E. Shrapnell Smith, 63; Utilization of Destructor Residuals, by W. Hillman, 63; Sewage disposal, by Prof. Henry Robinson, 64; Sanitary Inspectors, by T. F. Strutt, 64; Ventilation of Factories and Schools, 64; Sewage Effluents, by Prof. Dunbar, 67; Septic Tank Treatment, by W. Shanks, 67; Manchester Sewage System, by Dr. Fowler, 67; Patent Laws, by Hon. C. A. Parsons, 99; Municipal Housing, by Prof. Smart, 99; Evolution of Lotus Ornament, by Prof. Montelius, 99; Discoveries in Egypt, by Prof. Petrie, 99; Ancient Ruins in Rhodesia, by R. N. Hall, 99; Effects of Lightning, by Killingworth Hedges, 110; Testing Machine for Full-sized Members, by J. H. Wicksteed, 110; Tintern Abbey, by P. Baylis, 114; Simplon Tunnel, by M. Ziegler, 117; Proposed Barrage of the Thames, by James Casey, 117; Durability of Paints, by R. Jobb, 126; Portland Cement, by C. Richardson, 139, 154; Tests on Reinforced Concrete Beams, by Prof. E. E. Turneure, 193; Architectural Photography, by E. Dockree, 203; Modern Decoration, by G. H. Morton, 220; Ventilation, by H. H. Grundy, 238, by W. Henman, 261; Romanesque Architecture in England, by O. F. Innocent, 240; Fever Hospitals, by Dr. Landier, 268; Ferro-concrete, by L. G. Mouchel and W. Dunn, 275; The Building Surveyor, by John Mann, 289; How to Test the Strength of Timber, by Prof. T. Hudson Beare, 290; Westminster Abbey, by J. T. Micklethwaite, 294; Excavations at Westminster, by E. P. Warren, 294; Dustless Roads, by Scott Montagu, 301; Lancet Period of English Architecture, by J. R. Wigfall, 303; Byzantine Architecture, by Alex. McGibbon, 306; Some Architectural Reflections, by Raffles Davison, 307; Architecture in Eastern Europe, by E. M. Gibbs, 318; Choisy's Researches in Ancient Building Construction, by Prof. Capper, 329; Building By-Laws in Rural Districts, by Lacy W. Ridge, 330; Architectural Design and the London Building Act, by J. S. Gibson, 330; Notes on Brick and Tile Making, by Joseph Jopling, 331, 341; Street Architecture, by T. G. Jackson, 340.

Parchment, Colouring on, 184.

Paris: Architect of the Madeleine, 103; Bagatelle, 23; Beaux Arts, American Students at, 81; Celluloid Fire, Supp. Nov. 23rd, p. 13; Fire on Metropolitan Railway, Supp. Dec. 21st, p. 31.

Parliament, In, 36, 62, 86.

Parthenon, Columns of, 75.

Partition Test, Supp. Nov. 23rd, p. 10.

Partitions, Fireproof, 38, 104.

Partnerships, Architectural, 101.

Party-wall: Awards, 37; Underpinning, 51, 77.

Patents, 22, 99, 209.

Pearson's London Churches, 343.

Peat Building Blocks, 102.

Pecksniff, Junr., 339.

Pencil Sketches, Fixative for, 267.

Persia, House Building in, 293.

Peterborough, Buildings to measure around, 75.

Petroleum Blaze, Antwerp, Supp. Nov. 23rd, p. 12.

Photo-Copies of Drawings, 112.

Photographic Competition, 131.

Photography, Architectural, 203.

Photo-Printing Works, 335.

Pier, Purfleet, 247.

Pipes: Flow of Water in, 183; Lead-lined Iron, 22.

Pitch-Pine Timber, 123.

Planning, Library, 145.

Plans, Fire Insurance, Supp. Dec. 21st, p. 24.

Plaster: Cast of Ornament, 209; on Oak Panel, Removing, 43.

Plenum Ventilation, 161.

Plumber, Municipality and, 63.

Portsmouth, Nautical School, 35.

Portland Cement, 139, 154.

Post-Office, Northern District of London, 253.

Preservation of Old Buildings, Societies for, 103, 117.

Presidential Addresses: to Glasgow Congress of Royal Sanitary Institute, by Lord Blythswood, 63; to Architectural Association, by E. Guy Dawber, 175; to Manchester Society of Architects, by J. W. Beaumont, 207; to Sheffield

Society of Architects and Surveyors, by T. Winder, 207; to Architectural Association of Ireland, by J. H. Webb, 230; to Royal Institute of British Architects, by John Belcher, 251; to Society of Architects, by W. W. Thomas, 276; to Surveyors' Institution, 277; to Northern Architectural Association, 291.

Presidents, Session's, 284.

Prices, A Century of Building, 20.

Profession to Take Up, 76.

Property, Valuation of, 246.

Protection and Repair, 241.

Pumping Stations, Chelsea, 35.

Pumps, 169.

Purfleet Pier, 247.

Pwllheli, Buildings to measure around, 44.

QUANTITIES: Classes in, 169; Item in, 209.

Quantity Surveying, 226; Certificates for, 170.

Quarries, Bath Stone, 170.

RADIATOR, "Gas-steam," 337.

Rag Slating, 239.

Railway: Roofs, Leeds, 19; Uganda, 273; Underground, Fire Risks on, Supp. Dec. 21st, p. 30; Viaduct, Concrete, 337; West Australian, 215.

Rams, Hydraulic, 90.

Reflections, Some Architectural, 317.

Refuse-disposal, Book on, 209.

Registration, Architects', 23, 82.

Reinforced Concrete, 55, 193, 275, 306, Supp. Dec. 21st, p. 17.

Renovating Oak Gates and Posts, 183.

Restoration: Iona, 39; Marie Corelli on, 47.

Restorers, Amateur, 133.

Retaining Wall, Strengthening, 143.

Rhodesia, Ancient Ruins of, 99.

R.I.B.A. Examinations, 37, 226, 239, 265, 307, 343.

Right of Builder to take away Men, 22.

Ritz Hotel, London, 165, 235, 284.

Road: Gas Lime for, 307; Liability to make, 183, 192, 239; Payment for, 343.

Roads: Dustless, 301; How Macadam made them, 254.

Rome, Colosseum, 40.

Roman Architecture in Algeria, 148.

Romanesque Architecture in England, 240.

Roof: Damp Room in, 37; for Concert Hall, 87, 103; Damage done by Storm to, 225; Dry-rot in, Boarding, 246; Hip, 321; Tiles, 9; Trusses, 131, 266, 280, 321.

Roofs: on Corstorphine Church, 329; Railway, Leeds, 19.

Room in Roof, Damp, 37.

Rooms for "Human Habitation," 170.

Rot, Dry, 37, 192, 239, 246, 307, 343.

Rotherham Infectious Diseases Hospital, 70.

Rough-cast, 192, 280.

Rubbings, Tomb Stone, 44, 239.

Ruins of Rhodesia, 99.

Rural By-laws, 269, 279, 330.

ST. LOUIS EXHIBITION, 221, 284.

Sanatorium, Chapel at King's, 305.

Sandringham, Fire at, Supp. Nov. 23rd, p. 2.

Sanitary Engineers, Institute of, 51.

Sanitary Inspectors: Examinations, 145; Office, 64.

Sanitary Institute, Royal, 63, 67, 268.

Sashes, Sliding, When Introduced, 131.

Sea-folding and Hoisting, 125.

School: Nautical, Portishead, 35; L.C.C. Building, 212.

Schools: Defective, 267; Ventilation of, 64.

Schoolroom Dadoes, 152.

Sea-coast Erosion, 179.

Septic Tank Treatment, 67.

Sessions House, London, 22, 161, 190.

Session's Presidents, 284.

Sewage-disposal: 64, 67; Bradford, 238; Germany, 281; Manchester, 67.

Sewer: and Drain, 51; Connections to, 43.

Sewers and Closets, Liabilities for, 307.

Sheds, Motor-Car, 226.

Sheffield Society of Architects and Surveyors, 26, 207, 240, 303.

Sherborne, A.A. Excursion, 94.

Ships: Architectural Fitment of, 202; Fire Protection on Board, Supp. Nov. 23rd, p. 14.

Shop, Girder over, 307.

Shops and Stores, Fire Risks in, Supp. Dec. 21st, p. 18.

Shutters and Blinds, 25.

Simplon Tunnel, 117.

Sites: Greek, 135; L.C.C. Building, 65.

Slates, 102, 126.

Slating: 239; Battens, Bundling, 102.

Smoky Chimneys, Liability for, 280.

Soane Curatorship, 13, 25.

Societies for Preservation of Old Buildings, 103.

Sorel Cement, 308.

Sound-deadening, 76.

South Africa: Architecture and Building in, 235; Building Trade in, 87; "Building News and Contractors' Journal," 267; Cost of Building in, 239; Situations in, 118.

South Coast, Buildings to measure, 22.

South Wales, Buildings to measure in, 88.

Society Meetings: Architectural Association, 76, 94, 175, 203, 281, 293, 317; Society of Architects, 222, 276; of Engineers, 9, 179; British Association, 99; Junior Institute of Engineers, 156, 251, 281; Leeds and Yorkshire Architects, 280, 329; Liverpool Architectural Society, 220; Manchester Architects, 35, 207; Northern Architectural Association, 291; Royal Institute of British Architects, 46, 51, 167, 251, 275, 309, 322, 330; Royal Institute of the Architects of Ireland, 336; Architectural Association of Ireland, 230; Royal Sanitary Institute, 63, 67, 268; Sheffield Architects and Surveyors, 26, 207, 240, 303; Surveyors' Institution, 277, 289, 331, 341.

Space, Air, 103, 153.

Staff for Builders' Office, 131.

Standardized British Measures, 93.

Station: Chelsea Pumping, 35; Coast-guard, 307; Fire, Cologne, Supp. Nov. 23rd, p. 16; Victoria, 47; West Ham Electricity, 59.

Steel: Pickling, 255; Structural, Brittleness of, 110; Strength of, 143.

Steelwork, American Structural, 273.

Street: Architecture, 340; New, with Narrow Entrance, Building in, 225.

Stone: Bath Quarries, 170; Decay of, 269.

Stonework, Handling, 190.

Stove, Fireclay, 37.

Storm, Liability for Damage to Roof done by, 225.

Stratford-on-Avon, Cottages, 253.

Strikes and Lock-outs in 1903, 7.

Strike, Building, in New York, 152.

Subways, Traffic, 229.

Summer-house of Tiles and Cement, 232.

Supervision of Buildings, 26.

Surveyor: Assistant, Admiralty, 22; Building, 289.

Surveyors, Work approved and condemned by, 227, 240.

Surveyors' Institution, 277, 289, 331, 341.

Surveying, Quantity, Certificates for, 170.

Swanage, Buildings to measure around, 44.

Swimming Bath in Basement, 245.

TARIFF COMMISSION REPORT, 41, 41.

Temperatures at Great Fires, Supp. Nov. 23rd, p. 11.

Temporary Buildings in Gardens, 209.

Tender, Acceptance of Lowest, 246.

Tennyson, Watt's Statue of, 89.

Terra-cotta Floors, Tests with, Supp. Nov. 23rd, p. 10.

Testing: Machine for Full-Sized Members, 110.

Tests: with Concrete Floor Beams, Supp. Nov. 23rd, p. 15; Terra-Cotta Floor, same Supp., p. 10; on Reinforced Concrete Beams, 193; for Mortar, 192; with Partition, Supp. Nov. 23rd, p. 10; Strength of Timber, 290.

Thames: New Bridges over, 25, 121; Proposed Barrage of, 117.

Theatre: Fire at Carlisle, Supp. Nov. 23rd, p. 2; Regulations, 149; Two-Tier, 102.

Thrust, A Question of, 192.

Tile and Brick-making, 331, 341.

Tiles: Lamination of, 196; Roofing, 9.

Timber: 307; How to Test Strength of, 290; Pitch-Pine, 123; Trade, 137, 190, 320.

Tintern Abbey, 114.

Tomb of Nicholas Hawksmoor, 31.

Tomb Stone Rubbings, 44, 239.

Toronto Fire, Supp. Nov. 23rd, p. 8.

Tours through Gloucestershire and Oxfordshire, 43.

Town Halls, 280.

Trabected Arch, 36.

Trade and Craft: 38, 52, 77, 119, 132, 145, 228, 337.

Traffic: Subways, 229; Tunnels, Chicago, 188.

Trafford Park, Manchester, New Buildings in, 302.

Triangular Column for Shop Front, 225.

Trolley for Contractors, 132.

Tropics, Building in the, 143.

Trusses, Roof, 131, 266, 280, 321.

Tunnel, Simplon, 117.

Tunnels for Traffic, Chicago, 188.

UGANDA: Cathedral, 89; Railway, 273.

Underground Railways, Fire Risks on, Supp. Dec. 21st, p. 30.

Underpinning Party-walls, 51, 77.

University, Architectural School at Cambridge, 288.

Upton Isolation Hospital, 174.

"Uralite" Competition, 224.

VALUATION OF PROPERTY, 246.

Ventilation: 26, 238; False Rail, 50; Plenum, 161; of Factories and Schools, 64.

Viaduct, Concrete Railway, 337.

Victoria Memorial, 187.

Victoria Station, 47.

Views and Reviews: The History and Antiquities of St. Saviour's, Southwark, 10; The British Home of To-Day, 14; Modern Cottage Architecture, 14; Das Englische Haus, 14; English Architecture, 19; Municipal Shortcomings, 31; Stresses and Thrusts, 31; Scaffolding, 31; Notes on Steel Concrete Construction, 49; The Cathedral Church of Bayeux, 49; Notes on Blacksmith's Work, 49; The Lighting of Schoolrooms, 49; Fire and Explosion Risks, 49; Strength and Elasticity of Structural Members, 49; Molesworth's Pocket-Book of Formula and Memoranda for Engineers, 50; Technics, 50; Haddon Hall, 67; Properties of British Standard Sections, 67; Sea-Coast Erosion and Remedial Works, 67; Timber, 67; Single-Entry Bookkeeping for Builders, 67; Builders' Hoisting Machinery, 67; Decimal Coinage and Metric System, 90; New Edition of Ruskin, 90; Engineering Correspondence Course, 110; Assessment of Brickfields, 166; Picture Tiles for Hospital Wards, 171; The Alhambra, 171; Planning of Poor Law Buildings and Mortuaries, 179; Mechanics, 179; Practical Surveying, 209; Building Stones, 209; Hardwoods, 209; Houses for the Working Classes, 209; Practical Masonry, 223; Beginner's Guide to Carpentry, 223; Carpentry Workshop Practice, 223; Painting and Graining, 223; How to Collect Old Furniture, 232; New Streets, 232; Ornament and its Application, 232; Partition Test by British Fire Prevention Committee, Fire Exhibition at Earl's Court, Baltimore Fire, pp. 10, 11, Supp. Nov. 23rd; Leadless Decoration, Tiles, Faience and Mosaic, 292; Who's Who for 1903, 303; The Furniture Styles, 303.

Volute, Drawing, 75.

WAGONS, Municipal Motor, 63.

Waldeck-Rousseau's Waistcoat, 147.

Wales: South, Buildings to Measure in, 88; Water-supply from, for Birmingham, 35.

Wall, Cornice on, 62; Party, Awards, 37; Retaining, 143.

Walls: Damp, 62, 321; Underpinning Party, 51, 77.

Wallpapers, 52.

Warehouse: "Drenchers," Supp. Nov. 23rd, p. 11; New, at Hamburg, Supp. Dec. 21st, p. 26.

War Office, Assistant Surveyor, 265.

Water: in Cellar, 280; Flow in Pipes, 183; Mains, 267.

Water-supply: 103, 153; Birmingham, 35; by Hydraulic Rams, 90.

Waterworks, Germany, 281.

Watts: Frescoes, 1; Statue of Tennyson, 89.

Webb, Sir Aston, 255.

Wells, Light, 307.

West Ham Electricity Station, 59.

Westminster: Abbey, 294; Excavations at, 294; Photo-printing Works, 335.

Wimbledon, "Queen Alexandra's Court," 197.

Window Frame and Lightning Conductor, 227.

Wolverhampton Hospital for Women, 122.

Wood: Fire-resisting, 110; Painting, 143.

Workmen's Compensation, 69.

Works: Modern Cement, 2; Office of, 22; Photo-printing, 335.

ZOO, House for Animals at, 136.

ILLUSTRATIONS.

ABBEY, Croyland, 108.
Aberdeen, North U.F. Church, 177.
Abingdon Court, Kensington, Fireplace, 178.
Acton Town Hall, Supp. Dec. 28th, p. 9.
Æolian Hall, New Bond Street, London, Centre Plate No. 492, Supp. Dec. 28th, p. 9.
Agartala, Palace, 298, 299, Centre Plate No. 513.
Alms-houses: Bootham, Yorks, 17; Bidston, Liverpool, Supp. Dec. 28th, p. 21.
Amptill, Infectious Diseases Hospital, 128, 129.
Antwerp Petroleum Fire, Supp. Nov. 23rd, pp. 12, 13.
Arch, Trabeated, 36; at Timagd, 148.
Armagh Cathedral, Supp. Dec. 28th, p. 4.
Art Gallery: Laing, Newcastle, Supp. Dec. 28th, p. 7; and Museum, Sheffield, same Supp., p. 13.
Asylum, Woodilee, Nurses' Home, Supp. Dec. 28th, p. 3.
Athens, Penrose Memorial Library, Centre Plate No. 497.
Aylesford Bridge, 167.

BALTIMORE BUILDINGS, Effects of Fire on, Supp. Nov. 23rd, pp. 6, 7.
Bank: at Colchester, Centre Plate No. 507; of South Africa, Johannesburg, 294, 295; at New Brompton, Centre Plate No. 503.
Barnet, Wynn Lodge, Supp. Dec. 28th, p. 13.
Bartholomew's Hospital, London, Supp. Dec. 28th, p. 1.
Baths: New Brompton, 72; Haggerston, Supp. Dec. 28th, p. 8.
Batsford, B. L., Supp. Dec. 28th, p. 20.
Bayeux Cathedral, 49.
Bazaar, Bow, Calcutta, 300.
Beamster Church, 95.
Beams, Concrete, Swiss Floor of, Supp. Nov. 23rd, p. 15.
Bedale, Court-house and Police-station, Supp. Dec. 28th, p. 14.
Bedford, Francis W., 322.
Bedrooms: Modern, 15; "Rosehaugh," Ross-shire, 137; Sandringham, Supp. Nov. 23rd, p. 2.
Belfast Cathedral, Supp. Dec. 28th, p. 4.
Belfield Hall, 3.
Benson, Oxon, House at, 143, Centre Plate No. 501.
"Bibsworth," Worcs., Centre Plate No. 500.
Bickley, House at, Supp. Dec. 28th, p. 14.
Bidston, Liverpool, Alms-houses at, Supp. Dec. 28th, p. 21.
Billiard-room, "Tredean," Monmouth, 152.
Birch, G. H., Supp. Dec. 28th, p. 20.
Birmingham: Council House and Library, Erdington, Supp. Dec. 28th, p. 8; Day Schools at Bournville, same, p. 11; Latimer Memorial Church, same, p. 6; Theatre Royal, same, p. 26; Warehouse, Great Charles Street, 227, Centre Plate No. 507; Houses, Kineton Road, 7, 8; House for Mr. Cadbury, 124.
Blasting at Ritz Hotel, London, 165.
Bledlow, Cottage at, Centre Plate No. 510.
Blois, Fish Market, 323, Centre Plate No. 514.
Blundellsands, Presbyterian Church, Supp. Dec. 28th, p. 5.
Boilers, Chesterfield Infirmary, Supp. Dec. 28th, p. 26.
Bolton, Hall-i-th'-Wood, 3.
Bootham, Alms-houses, 17.
Botanical School, Cambridge, Supp. Dec. 28th, p. 11.
Bournville, Birmingham, Day Schools, Supp. Dec. 28th, p. 11.
Bow Bazaar, Calcutta, 300.
Bradford: Exhibition Buildings, Supp. Dec. 28th, p. 12; Schools at Wyke, same, p. 11; Town Hall, same, p. 8.
Bramhall Hall, 4.
Brancaaster, Norfolk, House at, 30.
Branches Park, Newmarket, Supp. Dec. 28th, p. 15.
Bredenbury Court, Entrance Doorway in Dining-room, 16.
Brickmaking Machine, 198.
Brick Partitions, Fireproof, 105.
Bridge: Aylesford, 167; Croyland, 109; Newport (Mon.), Sonning, Purfleet, London, Supp. Dec. 28th, p. 24.
Bridge of Allan, Ramsay's Sanatorium, 184.
Brighton, Premises for Royal Insurance Co., Supp. Dec. 28th, p. 17.
Bristol, Warehouse in Whiteladies' Road, Supp. Dec. 28th, p. 17.
Brittany, Concarneau, Oldest House at, 55.
Bromley, Sundridge Park, House at, 100.
Brompton, New: Baths, 72; Bank, Centre Plate No. 503.
Brussels, House near, Supp. Dec. 28th, p. 14.

Brympton: Tombs in Church, 95; Rain-water Pipe-head on House, 95.
Budapest, Fire at Business Premises, Supp. Dec. 21st, pp. 18-22.
Buenos Ayres, Hippodrome, 183.
Burma, Pegu, House in Chinese Quarter, 302.
Burton Hall, Cheshire, Supp. Dec. 28th, p. 15.
Burtonwood, Parish Hall, Supp. Dec. 28th, p. 6.
Bushey: "The Hut," Centre Plate No. 508; Congregational Church, 262.
Business Premises: Chancery Lane, London, Centre Plate No. 491; Norwich Union Life Insurance Society, Centre Plate No. 491; Hoyle's Warehouse, Manchester, 22, 75; Offices for N.E.R. Co., Cowley Street, Westminster, 45; Bank at New Brompton, Centre Plate No. 503; Duncan Street, Leeds, 184; Bank at Colchester, Centre Plate No. 507; Warehouse, Great Charles Street, Birmingham, 227, Centre Plate No. 507; Proposed Shops, Stroud, 259; No. 110, New Bond Street, London, 259; Banks at Johannesburg, 294, 295; Warehouse and Offices and Bow Bazaar, Calcutta, 300; Works for Messrs. Norton and Gregory, London, 335; at Budapest and Hamburg, Supp. Dec. 21st, pp. 18-22, 26; at Birmingham, Brighton, Bristol, Glasgow, Liverpool and London, Supp. Dec. 28th, pp. 16, 17, 19, 23, 25.

CALAIS, 55.
Calcutta: House for Rajah of Dighapatia, 300; Warehouse and Offices, and Bow Bazaar, 300.
Cambridge: Botanical School, Supp. Dec. 28th, p. 11; Law Library and Sedgwick Memorial Museum, same, p. 7; County School, Centre Plate No. 500.
Canadian Emigration Offices, Whitehall, London, Supp. Dec. 28th, p. 17.
Canal, Manchester Ship, Float on, Supp. Dec. 21st, p. 32.
Canterbury Cathedral Tower, 44.
Cardiff: University of South Wales and Monmouthshire, Supp. Dec. 28th, p. 13; Town Hall and Law Courts, same, p. 22.
Carshalton, Southern Hospital, Supp. Dec. 28th, p. 3.
Cartwright Memorial Hall, Bradford, Supp. Dec. 28th, p. 12.
Cathedral: Armagh, Belfast, Hereford, Leeds, Rochester and Truro, Supp. Dec. 28th, pp. 4, 5; Bayeux, 49; Canterbury, Central Tower, 44; Ely, 326, 327; Hildesheim, 82, 83; Ironwork at Gloucester, 114; Liverpool, Centre Plates Nos. 504 and 506; Siena, Wall Tablet, Centre Plate No. 507; Wells, 42, 43.
Celluloid Fire, Paris, Supp. Nov. 23rd, p. 13.
Chapel: King Edward VII. Sanatorium, 304, 305, 306, Centre Plate No. 513; Magdalen College, Oxford, Doorway, 47; Sugar's, Wells Cathedral, 43.
Chattis Hill, House at, 178, Centre Plate No. 504.
Cheddar Church, 5.
Chelsea: 75, Cheyne Walk, 27, Centre Plate No. 493; Dispensary, 29; "Underground" Electricity Generating Station, Supp. Dec. 28th, p. 9.
Cheltenham, Hay Cottage Homes, Supp. Dec. 28th, p. 21.
Chelwood Manor, Sussex, Supp. Dec. 28th, p. 14.
Cheshire: Burton Hall, Supp. Dec. 28th, p. 15; Cottages at Neston, same, p. 21.
Chesterfield Infirmary, Boilers at, Supp. Dec. 28th, p. 26.
Chetham's College, Manchester, 2.
Children's Ward, Tunbridge Wells General Hospital, Supp. Dec. 28th, p. 2.
Children's Convalescent Home, St. Anne's-on-Sea, Supp. Dec. 28th, p. 1.
Chinese Quarter, Pegu, House in, 302.
Choisy, M. Auguste, Supp. Dec. 28th, p. 10.
Chorley Hall, 6.
Christchurch Priory, Vault, Centre Plate No. 503.
Christ's Hospital, London, Counting-house, 211.
Church: Beamster, 95; Brympton, 95; Bushey, 262; Cheddar, 5; Corstorphine, 329; Gawsforth, 6; Kingston-on-Thames, 231; Market, Hanover, 80; Moberly, 5; Middleton, 4; Muswell Hill, London, 260; North Cadbury, 94; North U.F., Aberdeen, 177; Piddletown, 96; Shawford Down, Winchester, Centre Plate No. 494; Tintinhull, 98; Wesleyan, and Schools, Long Eaton, 234, Centre Plate No. 508; Presbyterian, Blundellsands, Supp. Dec. 28th, p. 5; Christ Scientist, Manchester, same, p. 5; Clapham, same, p. 6; Cowley, Oxford, same, p. 6; Latimer Memorial, Birmingham,

same, p. 6; Palmer's Green, London, same, p. 6; Peckham, same, p. 6; St. Andrew's, Linacre, Liverpool, same, p. 6.
City, Garden, Reservoir for, Supp. Dec. 28th, p. 23.
Clapham: Church, Supp. Dec. 28th, p. 6; Gate and Railings, 336.
Clay Separating Machine, 198.
Clegg Hall, 3.
Clifton Maybank, Roof at, 95.
Cloth Hall, Malines, 76.
Colchester, Bank at, Centre Plate No. 507.
"Coldicote," Worcs., Centre Plate No. 500.
Coliseum, London, 217-223, 242-246, 312-319, Centre Plates No. 514.
College: Chetham's, Manchester, 2; Glasgow, 134, 135; Magdalen, Oxford, Doorway to Chapel, 47; Radley, Supp. Dec. 28th, p. 11; of Science, South Kensington, same, p. 11.
Colls, J. Howard, Supp. Dec. 28th, p. 10.
Colman Institute, Redhill, Supp. Dec. 28th, p. 10.
Cologne, Fire Station, Supp. Nov. 23rd, p. 16.
Colosseum, Rome, 40, 41.
Columns: Baltimore Buildings, after Fire, Supp. Nov. 23rd, pp. 6, 7; London Coliseum, 319; for Shop Front, 225.
Concarneau, Brittany, Oldest House at, 55.
Concrete Beams, Swiss Floor of, Supp. Nov. 23rd, p. 15.
Convalescent Home for Children, St. Anne's-on-Sea, Supp. Dec. 28th, p. 1.
Corbel, Crevkerne, 95.
Coroner's Court and Mortuary, &c., 163.
Corstorphine Church, New Roofs, 329.
Cottage Homes, Hay, Cheltenham, Supp. Dec. 28th, p. 21.
Cottages: Bledlow, Centre Plate No. 510; Covehithe, 100, 232; Gough Park, Enfield, 121; Meldreth, Centre Plate No. 510; Milford-on-Sea, Centre Plate No. 510; Neston, Cheshire, Supp. Dec. 28th, p. 21; Overbury, Worcester, 14; Pad-dockhurst, 15; Shotter Mill, 265; Stratford-on-Avon, 253, 254; Torquay, 336; Upper Warrington, 257.
Cotton Exchange, Liverpool, Supp. Dec. 28th, p. 19.
Council House and Library, Erdington, Birmingham, Supp. Dec. 28th, p. 8.
Council Offices, Pontypriod, Supp. Dec. 28th, p. 8.
Counting-house, Christ's Hospital, London, 211.
Court: Abingdon, Kensington, Fireplaces at, 173; Bredenbury, Entrance Doorway in, 16; Coroner's and Mortuary, &c., 163; "Queen Alexandra's," Wimbles-ton, 197.
Court-house and Police-station, Bedale, Supp. Dec. 28th, p. 14.
Coutts's Bank, London, Supp. Dec. 28th, p. 16.
Covehithe, Cottages at, 230, 232.
Covent Garden Flower Market, Supp. Dec. 28th, p. 19.
Cowley Church Tower, Oxford, Supp. Dec. 28th, p. 6.
Cranes, Ritz Hotel, London, 208, 209.
Crematorium, Little Ilford Cemetery, Supp. Dec. 28th, p. 7.
Crescent: Design for, Centre Plate No. 491; in a Large City, Supp. Dec. 28th, p. 12.
Crevkerne, Roof Corbel, 95.
Croyland: Abbey, 108, Bridge, 109.

DENTON HALL, 4.
Dighapatia, Rajah of, House in Calcutta, 300.
Dinan, Tour de l'Horloge, 23.
Disinfecting Station, Laundry for, 181.
Dispensary, Chelsea, 29.
Dock, Hebburn-on-Tyne, Supp. Dec. 28th, p. 24.
Domed Roofs in Persia, 293.
Doors, Titancrore, Supp. Nov. 23rd, pp. 4, 5.
Doorway: Bredenbury Court, 16; Magdalen College Chapel, Oxford, 47.
Drenchers, Jaeger Warehouse, London, Supp. Nov. 23rd, p. 11.
Drill Hall, Lancaster, Supp. Dec. 28th, p. 26.
Durban Town Hall, 70, Centre Plate No. 496.
"Durham Castle," Saloon, Smoking-room and Reading-room, 202, 203, 204, 205.

EASTBOURNE, Library and Technical School, 150, 151, Centre Plate No. 502.
East Grinstead, Lodge at, 14.
Ecclesiastical Commissioners, Premises for, at Westminster, Supp. Dec. 28th, p. 23.
Edinburgh, Midlothian County Buildings, Supp. Dec. 28th, p. 8.

Electric Railway, Paris, Plans of Stations, Supp. Dec. 21st, p. 31.
Electric Winding Gear for Lifts, London Coliseum, 315.
Electricity Station, West Ham, 59, 60, 61, 62.
Ely Cathedral and Bishop's Palace, 326, 327.
Emanuel, Barrow, Supp. Dec. 28th, p. 20.
Enfield, Gough Park, Cottage at, 101.
Excavations, Timagd, 148, 149.
Exchange: Liverpool Cotton, Supp. Dec. 28th, p. 19; Manchester Stock, same.
Exhibition: Bradford, Supp. Dec. 28th, p. 12; St. Louis, 284, 285, Centre Plates No. 512, Show-case for Exhibition, 303.
Exmouth Cottage Hospital, Supp. Dec. 28th, p. 3.

"FALSE RAIL" VENTILATION, 50.
Farham, "Dial House," Centre Plate No. 497.
Ferro-concrete Pier, Purfleet, 247-250.
Festival Theatre, Proposed, Centre Plates No. 505.
Finial, Montacute House, 96.
Fire: Alarm Street Box, Supp. Nov. 23rd, p. 11; Celluloid, Paris, same, p. 13; Petroleum, at Antwerp, same, pp. 12, 13; Station, Cologne, same, p. 18; at Business Premises, Budapest, Supp. Dec. 21st, pp. 18-22; Brigades' Shield, same, p. 31; Golden Lane, London, Plan of, same, p. 25; Oil, Hamburg, same, pp. 28, 29; Red Lion Market, London, same, p. 23.
Firebrakes, Georgian, 77.
Fireplaces: Abingdon Court, Kensington, 178; "Rosehaugh," Ross-shire, 138.
Float, Manchester Ship Canal, Supp. Dec. 21st, p. 32.
Floor: Swiss, of Concrete Beams, Supp. Nov. 23rd, p. 15; Terra-Cotta, New York, same, p. 10.
Font, Piddletown Church, 96.
Foundations, Ritz Hotel, London, 164, 165.
Fish Market, Blois, 323, Centre Plate No. 514.
Frimley Sanatorium, Supp. Dec. 28th, pp. 1, 3.
Frinton, Seaside Houses at, Centre Plate No. 505.

GAILEY HOTEL AND THEATRE, London, Supp. Dec. 28th, p. 18.
Garden City Reservoir, Supp. Dec. 28th, p. 23.
Garden: Summer House and Shelter, 233; Study for a Formal, 111.
Gatehouse, Kenyon Peel Hall, 3.
Gates: Clapham Common, 336; Worsley Hall, Supp. Dec. 28th, p. 26.
Gawsworth Church, 6.
Georgian: Firebrakes, 77; Mansion in Warwickshire, 159.
Ghent, Market Square, 54.
Girders, London Coliseum, 318, 319, Centre Plates No. 514.
Glasgow: College and University, 134, 135; Premises in West George Street, Supp. Dec. 28th, p. 16; Warehouse in Buchanan Street, Supp. Nov. 23rd, pp. 3, 4, 5; Stobhill General Hospital, Centre Plate No. 515.
Gloucester, Ironwork at Cathedral, 114.
Gough Park, Enfield, Cottage at, 101.
Grange, Preston, 98.
Granolithic Roofs on Corstorphine Church, 329.
"Great Austins," Centre Plate No. 502.
Great Stanmore, House at, Centre Plate No. 493.
Grillage Plan, Ritz Hotel, London, 236.
Grinding Mill, 198.
Grinstead, Lodge at East, 14.
Guildhall, Hildesheim, 84.
Gymnasium, Lantern Light, 266.

HAGGERSTON PUBLIC BATHS, Supp. Dec. 28th, p. 8.
Hall-i-th'-Wood, Bolton, 3.
Halls: Æolian, New Bond Street, London, Centre Plate No. 492; Belfield, 3; Bramhall, 4; Chorley, 6; Clegg, 3; County, Northallerton, Centre Plate No. 506; Denton, 4; Kenyon Peel, 3, 4; Horticultural Society's, London, Centre Plate No. 516; Cloth, Malines, 76; Marple, 5; North Cadbury, 94; Tissington, Centre Plate No. 499; Burton, Cheshire, Supp. Dec. 28th, p. 15; Cartwright Memorial, Bradford, same, p. 12; Parish, Burtonwood, same, p. 6; Drill, at Lancaster, same, p. 26; Ironmonger's, London, same, p. 13; Law Society's, London, same, p. 7; Market, Leeds, same, p. 19; Magdalen College, Oxford, same, p. 2; Imperial Monuments, Westminster, same.
Hamburg, Warehouses, and Oil Fire, Supp. Dec. 21st, pp. 26, 28, 29.

Hammersmith : Central Library, Centre Plate No. 499 ; St. Paul's School for Girls, Supp. Dec. 28th, p. 11.
Hamstead, House at Bracknell Gardens, Centre Plate No. 492.
Hanover, Rathaus and Market Church, 80, "Hanover House," Regent's Park, London, 166, Centre Plate No. 503.
Hebburn-on-Tyne, New Dock, Supp. Dec. 28th, p. 24.
Hebrew Ward, London Hospital, Supp. Dec. 28th, p. 3.
"Hercules" Partition Blocks, 38.
Hereford Cathedral, Supp. Dec. 28th, p. 4.
Hildesheim, Houses, Cathedral and Guildhall, 81, 82, 83, 84.
Hill Wootton, Warwick, House at, 258.
Hindhead, House at, 89, Centre Plate No. 497.
Hippodrome, Buenos Ayres, 183.
Homes : Nurses' at Woodilee Asylum, at Rochdale, and at Charing Cross Hospital, London, Supp. Dec. 28th, p. 3 ; Hay Cottage, Cheltenham, same, p. 21.
Horder, P. Morley, 266.
Horticultural Society's Hall, London, Centre Plate No. 516.
Hospital : Infectious Diseases, Amptill, 128, 129 ; Christ's, London, Counting-House at, 211 ; Orthopaedic, London, 263 ; Stobhill General, Glasgow, Centre Plate No. 515 ; Upton-on-Severn, 174, 175, 176 ; for Women, Wolverhampton, 122, 123 ; St. Bartholomew's, London, Supp. Dec. 28th, p. 1 ; Seacroft, Leeds, same ; Tunbridge Wells, same, p. 2 ; London Lying-in, same ; Y-shaped Ward, same ; London, same, p. 3 ; Exmouth Cottage, same ; Southern, Carlshaton, same ; Nurses' Home, Charing Cross, London, same.
Hotel and Club, Liverpool, Supp. Dec. 28th, p. 18.
Hotels : Ritz, London, 164, 165, 235-238, 286-291, Centre Plate No. 512 ; Savoy, Ritz, Waldorf and Gayety, London, Supp. Dec. 28th, p. 18.
Houses : Barnett, Supp. Dec. 28th, p. 13 ; Benson, Oxon, 143, Centre Plate No. 501 ; "Bibsworth," Worcs., Centre Plate No. 500 ; Bickley, Supp. Dec. 28th, p. 14 ; Birmingham, 7, 8 ; for Mr. Cadbury, Birmingham, 124 ; Branches Park, Newmarket, Supp. Dec. 28th, p. 15 ; Brussels, same, p. 14 ; Burton Hall, Cheshire, same, p. 16 ; "The Hut," Bushey, Centre Plate No. 508 ; Brympton, 95 ; Calcutta, 300 ; Chattis Hill, 178, Centre Plate No. 504 ; No. 75, Cheyne Walk, Chelsea, 26, Centre Plate No. 493 ; Chelwood Manor, Sussex, Supp. Dec. 28th, p. 14 ; Chinese Quarter, Pegu, Burma, 302 ; Chorley Wood, 270, 271 ; "Coldicote," Worcs., Centre Plate No. 500 ; Concarneau, Brittany, 56 ; Frinton, Centre Plate No. 505 ; "Dial House," Farnham, Centre Plate No. 497 ; "Great Austins," Centre Plate No. 502 ; Great Stanmore, Centre Plate No. 494 ; Bracknell Gardens, Hampstead, Centre Plate No. 492 ; Hanwell, 261 ; Hildesheim, 81, 84 ; Hill Wootton, Warwick, 258 ; Hindhead, 89, Centre Plate No. 497 ; Palace Gardens, Kensington, 261 ; Hornton Street, Kensington, 273, Centre Plate No. 511 ; Knock, Centre Plate No. 509 ; "Sealand," Littlestone-on-Sea, 28 ; Ingram, Stockwell, London, Supp. Dec. 28th, p. 18 ; 10 and 11, Park Place, London, same, p. 21 ; "Hanover," Regent's Park, 166, Centre Plate No. 503 ; Malvern Wells, 153 ; Mill Hill, Supp. Dec. 28th, p. 21 ; Montacute, 96, 97 ; "Myholme," Bushey, 271, 272 ; Norbury Manor Estate, 35, Centre Plate No. 493 ; Brancaster, Norfolk, 30 ; Norfolk, Centre Plate No. 495 ; King Street, Oxford, 251, Centre Plate No. 509 ; Pans Nant-glyn, North Wales, 257 ; Roehampton, Centre Plate No. 501 ; "Rosehaugh," Ross-shire, 138, 137, 138, Centre Plate No. 501 ; Rugby, Centre Plate No. 494 ; Small Country, 30, Centre Plate No. 495 ; Streatham Park, 16 ; Stroud, 258 ; Studland Bay, 100 ; Sundridge Park, Bromley, 100 ; Thornton Hough, Liverpool, Supp. Dec. 28th, p. 21 ; Tintinhull, 98 ; Warwick, 157, 256 ; "Portley Wood," Whyteleafe, Surrey, Centre Plate No. 492 ; Wimbledon, Wintorslow and Winsley, Supp. Dec. 28th, p. 14 ; Wolvesnewton, 103, Centre Plate No. 498, Supp. Dec. 28th, p. 21.
Hoyle's Warehouse, Manchester, 22, 75.
Humphry Museum, Medical Schools and, Cambridge, Supp. Dec. 28th, p. 11.

ILFORD CREMATORIUM, Supp. Dec. 28th, p. 7.
Ikley, Library and Public Offices, Supp. Dec. 28th, p. 7.
Infirmary : Chesterfield, Boilers at, Supp. Dec. 28th, p. 26 ; Manchester, same, p. 3.
Ingram House, Stockwell, London, Supp. Dec. 28th, p. 18.
Inn, "Black Swan," York, 71.
Institute : Colman, Redhill, Supp. Dec. 28th, p. 10 ; for East London, same, p. 14.
Ironmongers' Hall, London, Supp. Dec. 28th, p. 13.
Ironwork, Gloucester Cathedral, 114.

JERUSALEM, Shrine of the Holy Sepulchre, 189.
Johannesburg, National Bank of South Africa, 294, 295 ; Railway Station, Supp. Dec. 28th, p. 17.

KENSINGTON : Abingdon Court, Fireplace, 178 ; Rebuilding of Hornton Street, 279, Centre Plate No. 511 ; Royal College of Science, Supp. Dec. 28th, p. 11.
Kent, House at Bickley, Supp. Dec. 28th, p. 14.
Kenyon Peel Hall, 3, 4.
Kerr, Prof., Supp. Dec. 28th, p. 20.
Kettering Library, Supp. Dec. 28th, p. 7.
Khaligat, Temple at, 301, Centre Plate No. 513.
Kilbowie, Singer's Cabinet Works, Supp. Dec. 28th, p. 16.
King Edward VII. Sanatorium, Midhurst, 304, 305, 306, Centre Plates No. 498 and 513.
Kingston-on-Thames, St. Luke's Church, 231.
Kingsway Subway, London, Supp. Dec. 28th, p. 9.
Knock, House at, Centre Plate No. 509.

LAING ART GALLERY, Newcastle, Supp. Dec. 28th, p. 7.
Lancaster, Drill Hall, Supp. Dec. 28th, p. 26.
Lantern Light, Gymnasium, 266.
Latimer Memorial Church, Birmingham, Supp. Dec. 28th, p. 6.
Laundry, Disinfecting Station, 181.
Law Courts and Town Hall, Cardiff, Supp. Dec. 28th, p. 22.
Law Library, Cambridge, Supp. Dec. 28th, p. 7.
Law Society's Hall, London, Supp. Dec. 28th, p. 7.
Leeds : Premises in Duncan Street, 184 ; Roof at Central Station, 19 ; City Square, Supp. Dec. 28th, p. 16 ; Market Hall, same, p. 19 ; St. Anne's Cathedral, same, p. 4 ; Seacroft Hospital, same, p. 1.
Lewis, David, Workmen's Hostel and Club, Liverpool, Supp. Dec. 28th, p. 18.
Leyesian Mission Building, London, Supp. Dec. 28th, p. 10.
Library : Eastbourne, 150, 151, Centre Plate No. 502 ; Hammersmith, 115, Centre Plate No. 499 ; Penrose Memorial, Athens, Centre Plate No. 497 ; Sansovino, Venice, Centre Plate No. 507 ; Stratford-on-Avon, 253 ; and Council House, Erdington, Birmingham, Supp. Dec. 28th, p. 8 ; Law, Cambridge, same, p. 7 ; and Public Offices, Ilkley, same, and Municipal Buildings, Rawtenstall, Manchester, same, p. 8 ; and Municipal Offices, Torquay, same, p. 9 ; Wakefield, same, p. 7 ; Kettering, same, p. 7.
Lift Winding Gear, London Coliseum, 315.
Linacre, Liverpool, St. Andrew's Church, Supp. Dec. 28th, p. 6.
Littles one-on-Sea, "Sealand," 28.
Little Ilford Cemetery, Crematorium, Supp. Dec. 28th, p. 7.
Liverpool : Almshouses at Bidston, Supp. Dec. 28th, p. 21 ; Banks, same, p. 16 ; Colonial House, same, p. 17 ; Cotton Exchange, same, p. 19 ; David Lewis Workmen's Hostel and Club, same, p. 18 ; Mersey Dock and Harbour Board Offices, same, pp. 19, 25 ; Queen Victoria Memorial, same, p. 12 ; St. Andrew's Church, Linacre, same, p. 6 ; House at Thornton Hough, same, p. 21.
Local Government Board Offices, London, Supp. Dec. 28th, p. 23.
Lock, Teddington, Supp. Dec. 28th, p. 24.
Lodge : Barnett, Supp. Dec. 28th, p. 13 ; East Grinstead, 14 ; Glasgow College, 134 ; Overbury, Supp. Dec. 28th, p. 13 ; Pembury, 66 ; "Porters," Shenley, 58.
London : Aolian Hall, New Bond Street, Centre Plate No. 492 ; No. 75, Cheyne Walk, Chelsea, 26, Centre Plate No. 493 ; Premises off Chancery Lane, Centre Plate No. 491 ; Counting-house at Christ's Hospital, 211 ; Gate and Railings, Clapham Common, 336 ; Coliseum, 217-223, 242-246, 312-319, Centre Plates No. 514 ; House at Bracknell Gardens, Hampstead, Centre Plate No. 492 ; Fireplace at Abingdon Court, Kensington, 178 ; Hall at 16, Kensington Palace Gardens, 261 ; Central Library, Hammersmith, 115, Centre Plate No. 499 ; "Hanover House," Regent's Park, 166, Centre Plate No. 503 ; Rebuilding of Hornton Street, Kensington, 279, Centre Plate No. 511 ; Church at Muswell Hill, 260 ; Photo-Printing Works, Buckingham Gate, 335 ; Proposed Mosque, 171, 172 ; Premises in New Bond Street, 259 ; Orthopaedic Hospital, 263 ; Ritz Hotel, 164, 165, 235-238, 286-291, Centre Plate No. 512 ; Royal Horticultural Society's Hall, Centre Plate No. 516 ; Sessions House, Old Bailey, 190, 191 ; Staircase in Old City Mansion, 212 ; Offices for the N.E.R. Co., Cowley Street, Westminster, 45 ; Acton Town Hall, Supp. Dec. 28th, p. 9 ; St. Bartholomew's Hospital, same, p. 1 ; Premises for Bell and Sons, same, p. 17 ; Business Premises, Tooley Street, same,

p. 16 ; Bridge, same, p. 24 ; Canadian Emigration Offices, same, p. 17 ; "Underground" Electricity Generating Station, Chelsea, same, p. 9 ; Clapham Parish Church, same, p. 6 ; Fires in Red Lion Market and Golden Lane, Supp. Dec. 21st, pp. 23 and 25 ; Covent Garden Flower-Market, Supp. Dec. 28th, p. 19 ; Haggerston Public Baths, same, p. 8 ; Imperial Monuments Hall, Westminster, same, p. 2 ; Institute, same, p. 14 ; Ironmongers' Hall, same, p. 13 ; Kingsway Subway, same, p. 9 ; Law Society's Hall, Chancery Lane, same, p. 7 ; Leyesian Mission Building, City Road, same, p. 10 ; Local Government Board Offices, Whitehall, same, p. 23 ; Hospital, same, p. 3 ; Lying-in Hospital, same, p. 2 ; 10 and 11, Park Place, same, p. 21 ; Nurses' Home, Charing Cross Hospital, same, p. 3 ; Church at Palmer's Green, same, p. 6 ; Church at Peckham, same, p. 6 ; Royal College of Science, South Kensington, same, p. 11 ; St. Paul's School for Girls, Hammersmith, same, p. 11 ; Savoy, Waldorf, Ritz and Gayety Hotels, and Ingram House, same, p. 18 ; South Kensington Museum Extensions, same, p. 23 ; Whistler's Peacock Room, same, p. 10.
Long Eaton, Wesleyan Church and Schools, 234, Centre Plate No. 508.
Louis, St., Exhibition Buildings, 284, 285, Centre Plate No. 512 ; show-case, 303.

MACHINE : Brickmaking, 198 ; for Notching Girders, &c., 119.
Magdalen College Hall, Oxford, Supp. Dec. 28th, p. 2.
Malines, Cloth Hall, 76.
Malvern Wells, House at, 153.
Manchester : Chetham's College, 2 ; Hoyle's Warehouse, 22, 75 ; Float on Ship Canal, Supp. Dec. 21st, p. 32 ; Church of Christ Scientist, Supp. Dec. 28th, p. 5 ; Library and Municipal Buildings, Rawtenstall, same, p. 8 ; Royal Infirmary, same, p. 3 ; Stock Exchange, same, p. 19.
Mandir, 302.
Manor, Chelwood, Supp. Dec. 28th, p. 14.
Market : Church, Hanover, 80 ; Covent Garden, Supp. Dec. 28th, p. 19 ; Fish, at Blois, 323, Centre Plate No. 514 ; Hall, Leeds, Supp. Dec. 28th, p. 19.
Marple Hall, 5.
Mawson, Richard, Supp. Dec. 28th, p. 20.
Meldreth, Cottage at, Centre Plate No. 510.
Memorial : Cartwright, Bradford, Supp. Dec. 28th, p. 12 ; Victoria, Liverpool, same, p. 12 ; Victoria, Rochdale, same, p. 3.
Mersey Dock and Harbour Board Offices, Supp. Dec. 28th, pp. 19, 25.
Middleton : Church Tower, 4 ; Church and School, Supp. Dec. 28th, p. 5.
Midhurst, King's Sanatorium, 304, 305, 306, Centre Plates Nos. 498 and 513.
Midland Railway Station, Nottingham, Supp. Dec. 28th, p. 19.
Midlothian County Buildings, Edinburgh, Supp. Dec. 28th, p. 8.
Milan, Ospedale Maggiore, 57.
Milford-on-Sea, Cottage at, Centre Plate No. 510.
Mill, Grinding, 198.
Mill Hill, House at, Supp. Dec. 28th, p. 21.
Minton, Pagoda, 302.
Mission Building, Leyesian, London, Supp. Dec. 28th, p. 10.
Mobbey Church Tower, 5.
Monmouth, "Tredean," Billiard-room, 152.
Montacute House, Finsal and Porch, Priory, 96, 97.
Mortuary : Coroner's Court and, &c., 163 ; Window, 180.
Mosque, London, Proposed, 171, 172.
Mount Melville, Stables, Centre Plate No. 508.
Municipal Buildings : Sunderland, Supp. Dec. 28th, p. 8 ; and Library, Rawtenstall, Manchester, same ; Torquay, same, p. 9.
Murray, Dr. A. S., Supp. Dec. 28th, p. 20.
Museum : Humphry, and Medical Schools, Cambridge, Supp. Dec. 28th, p. 11.
Sedgwick Memorial, Cambridge, same, p. 7 ; and Art Gallery, Sheffield, same, p. 13 ; South Kensington, same, p. 23.
Mysore, Maharajah of, Temple, 301, Centre Plate No. 513.

NAUTICAL SCHOOL, Portishead, Supp. Dec. 28th, p. 11.
Neston, Cheshire, Cottages at, Supp. Dec. 28th, p. 21.
New Brompton : Bank, Centre Plate No. 503 ; Bath, 72.
Newcastle : Laing Art Gallery, Supp. Dec. 28th, p. 7 ; Royal Grammar Schools, same, p. 11.
Newmarket, Branches Park, Supp. Dec. 28th, p. 15.
Newport, Mon., Transporter Bridge, Supp. Dec. 28th, p. 24.
New York, Lyceum Theatre, 31.
Norbury Manor Estate, Houses on, 35, Centre Plate No. 493.
Norfolk, Houses in, Centre Plate No. 495.
North Cadbury : The Hall, 94 ; Church, 94.
Northallerton, County Hall, Centre Plate No. 506.

Norton, John, Supp. Dec. 28th, p. 20.
Norwich Union Life Insurance Society's Head Office, Centre Plate No. 491.
Notching Machine, 119.
Nottingham, Midland Railway Station, Supp. Dec. 28th, p. 19.
Nurses' Homes : Charing Cross Hospital, Rochdale and Woodilee Asylum, Supp. Dec. 28th, p. 3.

OIL FIRES : Antwerp, Supp. Nov. 23rd, pp. 12, 13 ; Hamburg, Supp. Dec. 21st, pp. 28, 29.
Orthopaedic Hospital, London, 263.
Ospedale Maggiore, Milan, 57.
Overbury, Cottages at, 14.
Oxford : Doorway to Magdalen College Chapel, 47 ; Magdalen College Hall, Supp. Dec. 28th, p. 2 ; Cowley Church Tower, same, p. 6 ; Houses in King Street, 251, Centre Plate No. 509.

PADDOCKHURST, Cottages at, 15.
Pagoda, Minton, 302.
Palace : Agartala, 298, 299, Centre Plate No. 513 ; Bishop's, Ely, 327.
Palmer's Green, London, Church at, Supp. Dec. 28th, p. 6.
Paris : Celluloid Fire, Supp. Nov. 23rd, p. 13 ; Stations on Underground Electric Railway, Supp. Dec. 21st, p. 31.
Partitions : Brick, Fireproof, 105 ; "Hercules," 38.
Party-wall, Underpinning, 51.
Pavilion, Ramsgate, Supp. Dec. 28th, p. 12.
Peacock Room, Whistler's, Supp. Dec. 28th, p. 10.
Peckham, Church at, Supp. Dec. 28th, p. 6.
Pegu, House in Chinese Quarter, 302.
Pembury, Lodge at, 66.
Penrose Memorial Library, Athens, Centre Plate No. 497.
Persia, Domed Roofs in, 293.
Petbick, John, Supp. Dec. 28th, p. 20.
Petroleum Fire at Antwerp, Supp. Nov. 23rd, pp. 12, 13.
Photo-printing Works, London, 335.
Piddletown Church, 96.
Pier, Purfleet, 247-250.
Pipe-head, Brympton House, 95.
Plans : Chetham's College, Manchester, 2 ; Hall-i'th-Wood, Bolton, 3 ; Bellfield Hall, 3 ; Kenyon Peel Hall, 4 ; Bramhall Hall, 4 ; Houses, Kington Road, Birmingham, 8 ; Dornay Cottages, Overbury, Worcester, 14 ; Lodge at East Grinstead, 14 ; Cottages at Paddockhurst, 15 ; House at Bracknell Gardens, Hampstead, Centre Plate No. 492 ; Aolian Hall, New Bond Street, London, Centre Plate No. 492 ; "Portley Wood," Whyteleafe, Surrey, Centre Plate No. 492 ; "Sealand," Littlestone-on-Sea, 28 ; Chelsea Dispensary, 29 ; Small Country House, 30 ; Houses on Norbury Manor Estate, 35 ; House at Great Stanmore, Centre Plate No. 493 ; Church at Shawford Down, Winchester, Centre Plate No. 494 ; "Porters," Shenley, 58, Centre Plate No. 495 and 496 ; West Ham Electricity Station, 60, 61 ; Small House, Centre Plate No. 495 ; House in Norfolk, Centre Plate No. 495 ; Durban Town Hall, 70 ; Baths, New Brompton, 72 ; Penrose Memorial Library, Athens, Centre Plate No. 497 ; "Dial House," Farnham, Centre Plate No. 497 ; House at Hindhead, 89 ; Houses at Bromley and Studland Bay, 100 ; House at Wolvesnewton, 103 ; Central Library, Hammersmith, 115 ; Wolverhampton Hospital for Women, 122, 123 ; Infectious Diseases Hospital, Amptill, 129 ; "Bibsworth," Worcs., Centre Plate No. 50 ; "Coldicote," Worcs., Centre Plate No. 500 ; Gate Lodge, Glasgow College, 134 ; House at Roehampton, Centre Plate No. 501 ; House at Benson, Oxon, 143 ; Eastbourne Library and Technical School, 150, 151 ; House at Malvern Wells, 153 ; "Great Austins," Centre Plate No. 502 ; Coroner's Court and Mortuary, &c., 163 ; Hanover House, Regent's Park, London, 166 ; Aylesford Bridge, 167 ; Bank at New Brompton, Centre Plate No. 503 ; Isolation Hospital, Upton-on-Severn, 174, 175, 176 ; North U.F. Church, Aberdeen, 177 ; House at Chattis Hill, 178 ; Plan of Laundry for Disinfecting Station, 181 ; Hippodrome, Buenos Ayres, 183 ; Ramsay's Sanatorium, Bridge of Allan, 184 ; Houses at Frinton, Centre Plate No. 505 ; "Queen Alexandra's Court," Wimbledon, 197 ; Smoking-room on "Durham Castle," 205 ; Roof of London Coliseum, 221 ; Bank at Colchester, Centre Plate No. 507 ; Warehouse, Great Charles Street, Birmingham, 227 ; Church and Schools Long Eaton, 234 ; Stables, Mount Melville, Centre Plate No. 508 ; Purfleet Pier, 248, 249, 250 ; House at Knock, Centre Plate No. 509 ; Houses in King Street, Oxford, 251 ; House at Warwick, 256 ; Congregational Church at Bushey, 262 ; Cottages at Meldreth, Milford-on-Sea and Bledlow, Centre Plates No. 510 ; Cottages at Shotter Mill, 265 ; House at Chorley Wood, 271 ; "Myholme," Bushey, 272 ; Toronto Fire Area, Supp. Nov. 23rd, p. 8 ; Rebuilding of

Hornton Street, Kensington, 279;
Ritz Hotel, Piccadilly, London, 236,
290, 291, Centre Plate No. 512; Chapel
at King's Sanatorium, Midhurst, 303,
304; Steelwork at London Coliseum,
314, 315; St. Bartholomew's Hospital,
Y-shaped Ward, Exmouth Cottage
Hospital and Laing Art Gallery, New-
castle, Supp. Dec. 28th, pp. 1, 2, 3 and
7; Business Premises, Budapest, Supp.
Dec. 21st, pp. 20, 21; of Fire Area,
Golden Lane, London, same, p. 25;
Warehouses, Hamburg, same, p. 26;
Hamburg Oil Fire, same, p. 29; County
Hall, Northallerton, Centre Plate No.
506.

Plas Nantglyn, North Wales, 257.

Plates, Centre: Proposed Premises off
Chancery Lane (T. Edwin Cooper,
architect), No. 491; Study for Colonnaded
Crescent Road (Frederick R. Hions,
architect), No. 491; New Head
Office for Norwich Union Fire Insurance
Society (G. J. and F. W. Skipper,
architects), No. 491; House at Bracknell
Gardens, Hampstead (C. F. A. Voysey,
architect), No. 492; "Portley Wood,"
Whyteleafe, Surrey (Walter E. Hewitt,
architect), No. 492; "Eolian Hall," New
Bond Street, London (Walter Cave,
architect), No. 492; House at Great
Stammore (Arnold Mitchell, architect),
No. 493; Six Houses on Norbury Manor
Estate (Frank S. Chesterton, architect),
No. 493; Drawing-room, No. 75, Cheyne
Walk, Chelsea, London (C. R. Ashbee,
architect), No. 493; House at Rugby
(John W. Simpson, architect), No. 494;
New Church at Shawford Down, Win-
chester (Charles J. Blomfield, archi-
tect), No. 494; "Porters," Shenley,
Herts (C. J. Harold Cooper, architect),
No. 495; Design for a Small House
(Sydney E. Castle, architect), No. 495;
Sketch for a House in Norfolk (Leslie T.
Moore, architect), No. 495; Stables,
"Porters," Shenley, Herts (C. J. Harold
Cooper, architect), No. 496; Durban
Town Hall and Municipal Buildings
(Arthur R. Jemmett, architect), No.
496; "The Dial House," Shortfield
Common, Farnham (Niven, Wiggles-
worth & Falkner, architects), No. 497;
Penrose Memorial Library, British
School at Athens (Heaton Comyn,
architect), No. 497; Proposed House at
Hindhead, Surrey (Reginald Morphew,
architect), No. 497; House at Wolves-
newton, Mon. (A. J. Hardwick, archi-
tect), No. 498; Administration Building,
King Edward VII. Sanatorium, Mid-
hurst (H. Percy Adams, architect), No.
498; Tissington Hall, Derbyshire
(Arnold Mitchell, architect), No. 499;
Central Library, Hammersmith (Henry
T. Hare, architect), No. 499; Cambridge
County School (Macalister and Tench),
architects, No. 500; "Bibsworth" and
"Coldicote," Worces. (E. Guy Dawber,
architect), No. 500; "Rosehaugh,"
Ross-shire (William Flockhart, archi-
tect), No. 501; "Recess," Benson, Ox-
fordshire (George Hornblower, archi-
tect), No. 501; House at Roehampton
Village (A. J. Hardwick, architect), No.
501; Public Library, Art, Science and
Technical School, Eastbourne (Philip
A. Robson, architect), No. 502; "Great
Austins" (Niven, Wigglesworth and
Falkner, architects), No. 502; Bank at
New Brompton, Kent (W. Campbell
Jones, architect), No. 503; Vault of
Salisbury Chantry, Christchurch Priory
(measured and drawn by John Swar-
brick), No. 503; "Hanover House,"
Regent's Park, London (E. P. Warren,
architect), No. 503; House at Chattis
Hill, Hampshire (Macalister and Tench,
architects), No. 504; Design for Liver-
pool Cathedral, Interior (C. A. Nichol-
son, architect), No. 504; Proposed Festi-
val Theatre (Edwin O. Sachs, archi-
tect), No. 505; Seaside Houses at Frinton,
Essex (Harrington and Ley, architects),
No. 505; County Hall, Northallerton
(Walter H. Brierley, architect), No. 506;
Design for Liverpool Cathedral, Exter-
ior (C. A. Nicholson, architect), No.
506; Details of Sansovino Library,
Venice, and Wall Tablet, Siena Cathed-
ral (drawn by H. Raine), No. 507;
Bank at Colchester (W. Campbell Jones,
architect), No. 507; Warehouse, Great
Charles Street, Birmingham (W. H.
Bidlake, architect), No. 507; Wesleyan
Church and Schools, Long Eaton
(Brewell and Bailey, architects), No.
508; Stables, Mount Melville, near St.
Andrews (Paul Waterhouse, architect),
No. 508; "The Hut," Herkemer Road,
Bushey (G. A. Hall, architect), No. 508;
Five Houses in King Street, Oxford
(E. P. Warren, architect), No. 509;
House at Knock, Ireland (F. Core,
architect), No. 509; York House Water-
gate (measured and drawn by John
Swarbrick), No. 509; Cottages at Bled-
low, Meldreth and Milford-on-Sea (P.
Morley Horder, architect), No. 510;
Rebuilding of Hornton Street, Ken-

sington (Frank S. Chesterton, archi-
tect), No. 511; Ritz Hotel, Piccadilly,
London, Column Schedule (Mewes and
Davis, architects, M. A. Potts & Co.,
engineers), No. 512; St. Louis Exhibi-
tion Buildings, No. 512; Chapel at
King Edward VII. Sanatorium, Mid-
hurst (H. Percy Adams, architect), No.
513; Palace at Agartala and Temple at
Khalighat (Edward Thornton, archi-
tect), No. 513; Fish Market, Blois,
France (M. Renou, architect), No. 514;
Steelwork, London Coliseum (Drew-
Bear, Perkins and Co., Ltd., constructional
engineers, Frank Matcham and Co.,
architects), No. 514; Stobhill General
Hospital, Glasgow (Thomson and Sand-
lands, architects), No. 515; New Hall
and Offices for the Royal Horticultural
Society, Vincent Square, Westminster
(Edwin J. Stubbs, architect), No. 515.
Pontypridd, Council Offices, Supp. Dec.
28th, p. 8.
Porch: Mr. Cadbury's House, Birming-
ham, 124; Montacute House, 97.
"Porters," Shenley, 58, Centre Plates Nos.
495 and 496.
Portsmouth, Nautical School, Supp. Dec.
28th, p. 11.
"Portley Wood," Whyteleafe, Surrey,
Centre Plate No. 492.
Preston: Grange, 98; Old Vicarage, 5.
Priory: Christchurch, Vault, Centre
Plate No. 503; Montacute, 97.
Pugin, P. P., Supp. Dec. 28th, p. 20.
Purfleet Pier, 247-250.

"QUEEN ALEXANDRA'S COURT," Wimbledon, 197. Queen-Post Trusses, 321.

RADLEY COLLEGE, Supp. Dec.
28th, p. 11.
Railway, Uganda, Girder-work, 273, 274.
Railway Station: Johannesburg, Supp.
Dec. 28th, p. 17; Paris, Supp. Dec. 21st,
p. 31.
Rainwater Pipe-head, Brympton House,
95.
Ramsay's Sanatorium, Bridge of Allan,
184.
Ramsgate, Victoria Pavilion, Supp. Dec.
28th, p. 12.
Rathaus, Hanover, 80.
Reading-room, "Durham Castle," 203.
Redhill, Colman Institute, Supp. Dec.
28th, p. 10.
Reservoir, Garden City, Supp. Dec. 28th,
p. 23.
Ritz Hotel, London, 164, 165, 235-238,
286-291, Centre Plate No. 512.
Roehampton, Nurses' Home, Supp. Dec. 28th,
p. 3.
Rochester Cathedral, Supp. Dec. 28th,
p. 4.
Roehampton, House at, Centre Plate No.
501.
Rome, Colosseum, 40, 41.
Roof: Cheadle Church, 5; Clifton May-
bank, 95; Corstorphine Church, 329;
Corbel, Crewkerne, 95; Domed, in
Persia, 291; Leeds Station, 19; London
Coliseum, 221; Magdalen College Hall,
Oxford, Supp. Dec. 28th, p. 2.
"Rosehaugh," Ross-shire, 136, 137, 138,
Centre Plate No. 501.
Rugby, House at, Centre Plate No. 494.

ST. ANNE'S-ON-SEA, Children's
Convalescent Home, Supp. Dec. 28th,
p. 1.
St. Louis Exhibition Buildings, 284, 285,
Centre Plate No. 512; show-case, 303.
St. Paul's School for Girls, Hammersmith,
Supp. Dec. 28th, p. 11.
Saloon, "Durham Castle," 202.
Samad, Agartala, 298.
Sanatorium: Frimley, Supp. 28th, pp. 1
and 3; King's, 304, 305, 306, Centre
Plates Nos. 498 and 513; Ramsay's,
Bridge of Allan, 184.
Sandringham, Rooms at, Supp. Nov. 23rd,
p. 2.
Sansovino Library, Venice, Centre Plate
No. 507.
Savoy Hotel, London, Supp. Dec. 28th,
p. 13.
Scaffolding and Hoist at Dalston Lane,
125; London Coliseum, 243, 244, 245.
School: Cambridge County, Centre Plate
No. 500; Technical, Eastbourne, 150,
151, Centre Plate No. 502; Wesleyan,
Long Eaton, 234, Centre Plate No. 508;
Medical, Cambridge, Supp. Dec. 28th,
p. 11; Bournville, Birmingham, same,
p. 11; Nautical, Portsmouth, same;
Wyke, Bradford, same; Botanical,
Cambridge, same; Grammar, New-
castle, same; Middleton Church, same,
p. 5.
Science, Royal College of, South Kensing-
ton, Supp. Dec. 28th, p. 11.
Seacroft Hospital, Leeds, Supp. Dec. 28th,
p. 1.
"Sealand," Littlestone-on-Sea, 28.
Seaside Houses at Frinton, Centre Plate
No. 505.

Seats in Smoking-room, "Durham Castle,"
204.

Sedgwick Museum, Cambridge, Supp.
Dec. 28th, p. 7.
Sessions House, Old Bailey, London, 190,
191.
Shambles, York, 24.
Shawford Down, Winchester, New Church,
Centre Plate No. 494.
Sheffield Museum and Art Gallery, Supp.
Dec. 28th, p. 13.
Shenley, "Porters," 58, Centre Plates Nos.
495 and 496.
Shield, Fire Brigades', Supp. Dec. 21st,
p. 31.
Shop Front, Triangular Column for, 223.
Shops: New Bond Street, London, 253;
Stroud, 259.
Shooter Mill, Cottages at, 265.
Show-case for St. Louis Exhibition, 333.
Shrine of the Holy Sepulchre, Jerusalem,
183.
Siena Cathedral, Wall Tablet in, Centre
Plate No. 507.
Signs on Insurance Plans, Supp. Dec.
21st, p. 24.
Singer's Cabinet Works, Kilbowie, Supp.
Dec. 28th, p. 16.
Smoking-room, "Durham Castle," 203,
204, 205.
Snell, H. Saxon, Supp. Dec. 28th, p. 20.
Sunning, Bridge at, Supp. Dec. 28th,
p. 24.
Southern Hospital, Carshalton, Supp.
Dec. 28th, p. 3.
South Kensington: Museum, Supp. Dec.
28th, p. 23; Royal College of Science,
same, p. 11.
South Wales and Monmouthshire, Univer-
sity of, Supp. Dec. 28th, p. 13.
Square: Leeds City, Supp. Dec. 28th,
p. 16; Market, Ghent, 54.
Stables: Mount Melville, Centre Plate
No. 508; "Porters," Shenley, Centre
Plate No. 496.
Stage, Revolving, at London Coliseum,
312, 313.
Stairs: Chapter-house at Wells Cathed-
ral, 42; Dalston, 125; Old City Man-
sion, London, 212; Glasgow, after fire,
Supp. Nov. 23rd, p. 8; Budapest, after
fire, Supp. Dec. 21st, p. 19.
Stall End, North Cadbury Church, 94.
Station: Disinfecting, for Laundry, 181;
Electricity, West Ham, 59, 60, 61, 62;
Roof at Leeds, 19; Fire, Cologne, Supp.
Nov. 23rd, p. 16; Midland Railway,
Nottingham, Supp. Dec. 28th, p. 19;
Railway, Johannesburg, same, p. 17;
Police, Bedale, same, p. 14; "Under-
ground" Electricity Generating, Chel-
sea, same, p. 9; Underground Railway,
Paris, Supp. Dec. 21st, p. 31.
Steelwork, London Coliseum, 217, 218,
220, 222, 223, 246, 314, 315, 318, 319,
Centre Plate No. 514.
Stobhill General Hospital, Glasgow,
Centre Plate No. 515.
Stock Exchange, Manchester, Supp. Dec.
28th, p. 19.
Stockport Town Hall, Supp. Dec. 28th,
p. 8.
Stone-handling Gear, 190.
Stratford-on-Avon, Old Cottages and
New Library, 253, 254.
Streatham Park, No. 2, West Drive, 16.
Stroud: Houses, 253; Shops, 259.
Stundland Bay, Two Houses at, 100.
Subway, Kingsway, London, Supp. Dec.
28th, p. 9.
Suffolk, Cottages at Covehithe, 230, 232.
Sugar's Chapel, Wells Cathedral, 43.
Summer House of Tiles and Cement, 233.
Sunderland Municipal Buildings, Supp.
Dec. 28th, p. 8.
Sundridge Park, Bromley, House at, 100.
Sussex, Chelwood Manor, Supp. Dec. 28th,
p. 14.
Swiss Floor of Concrete Beams, Supp.
Nov. 23rd, p. 15.

TEDDINGTON LOCK, Supp. Dec.
28th, p. 24.
Temple: Khalighat, 301, Centre Plate
No. 513; Mandir, 302.
Terra-cotta Floor, New York, Supp. Nov.
23rd, p. 10.
Theatre: London Coliseum, 217-223, 242-
246, 312-319, Centre Plates No. 514;
New Lyceum, New York, 31; Proposed
Festival, Centre Plates No. 505; Uni-
versity, Supp. Dec. 28th, p. 12; Gaiety,
same, p. 18; Royal, Birmingham, same,
p. 28.
Thornton, E., 298.
Thornton Hough, Liverpool, House at,
Supp. Dec. 28th, p. 21.
Timed Excavations, 148, 149.
Tintinhull, Window at, 97; House at, 98.
Tipperah, Maharajah of, Palace of, at
Agartala, 298, 299, Centre Plate No. 513.
Tissington Hall, Centre Plate No. 499.
Titanicre Doors, Supp. Nov. 23rd, pp. 4, 5.
Tombs: Brympton Church, 95; Piddlet-
own Church, 96.
Toronto Fire, Supp. Nov. 23rd, pp. 8, 9.
Torquay: Cottages at, 336; Library and
Municipal Offices, Supp. Dec. 28th, p. 9.
Tower: Calais, 55; Canterbury Cathed-

ral, 44; Cowley Church, Oxford, Supp.
Dec. 28th, p. 8; Tour de l'Horloge,
Dinan, 23; Middleton Church, 4; Mob-
berly Church, 5; Rochester Cathedral,
Supp. Dec. 28th, p. 4; Tintinhull
Church, 98.
Town Hall: Durban, 70, Centre Plate
No. 496; Hanover, 80; Acton, Supp.
Dec. 28th, p. 9; Bradford, same, p. 8;
Cardiff, same, p. 22; Stockport, same
p. 8.
Tunbridge Wells, General Hospital, Supp.
Dec. 28th, p. 2.
Tunnel, Dick Turpin's, London, 335.
Transporter Bridge, Newport, Mon.,
Supp. Dec. 28th, p. 24.
"Tredean," Monmouth, Billiard-room, 152.
Troly for Contractors, 132.
Truro Cathedral, Supp. Dec. 28th, p. 5.
Trusses, Queen-Post, 321.

UGANDA RAILWAY, Girderwork,
273, 274.
"Underground" Electricity Generating
Station, Chelsea, Supp. Dec. 28th, p. 9.
Underpinning Party-wall, 51.
University: Glasgow, 135; South Wales
and Monmouthshire, Cardiff, Supp.
Dec. 28th, p. 13; Theatre, same, p. 12.
Upper Warringham, Cottage at, 257.
Upton-on-Severn, Isolation Hospital, 174,
175, 176.

VAULT, Christchurch Priory, Centre
Plate No. 503.
Venice, Sansovino Library, Centre Plate
No. 507.
Ventilation "False Rail," 50.
Viaduct, Uganda Railway, 273.
Vicarage, Prestbury, 5.

**WAKEFIELD PUBLIC
LIBRARY**, Supp. Dec. 28th, p. 7.
Waldorf Hotel, London, Supp. Dec. 28th,
p. 18.
Wales, Plas Nantglyn, 257.
Wall Tablet in Siena Cathedral, Centre
Plate No. 507.
Wall, Underpinning Party, 51.
Ward: Children's, Tunbridge Wells
General Hospital, Supp. Dec. 28th, p. 2;
Hebrew, London Hospital, same, p. 3;
Y-shaped, same, p. 2.
Warehouses: Great Charles Street, Bir-
mingham, 227, Centre Plate No. 507;
Calcutta, 300; Hoyle's, Manchester, 22,
75; Buchanan Street Glasgow, Supp.
Nov. 23rd, pp. 3, 4, 5; Hamburg, Supp.
Dec. 21st, p. 26; Whiteladies' Road,
Bristol, Supp. Dec. 28th, p. 17.
Warleigham, Upper, Cottage at, 237.
Warwick, Houses at, 256, 258.
Warwickshire, Proposed Georgian Man-
sion in, 167.
Water-Gate, York House, Centre Plate
No. 509.
Watts, G. F., Supp. Dec. 28th, p. 20.
Wells Cathedral: Staircase to Chapter-
house, 42; Sugar's Chapel, 43.
Wesleyan Church and Schools, Middleton,
Supp. Dec. 28th, p. 5.
West Ham Electricity Station, 59, 60, 61,
62.
Westminster: Imperial Monuments Hall,
Supp. Dec. 28th, p. 2; Premises for
Ecclesiastical Commissioners, same, p.
23; Offices for N.E.R. Co., Cowley
Street, 45.
Whistler's Peacock Room, London, Supp.
Dec. 28th, p. 10.
Whyteleafe, "Portley Wood," Centre
Plate No. 492.
Wimbledon: House at, Supp. Dec. 28th,
p. 14; Queen Alexandra's Court, 197.
Winchester, New Church, Shawford Down,
Centre Plate No. 494.
Window: Mortuary, 180; at Tintinhull,
97.
Winsley House, Wilts, Supp. Dec. 28th,
p. 14.
Winterslow, House at, Supp. Dec. 28th,
p. 14.
Wolverhampton, Hospital for Women, 122
123.
Wolvesnewton, House at, 103, Centre
Plate No. 498.
Woodilee Asylum, Nurses' Home, Supp.
Dec. 28th, p. 3.
Worcester, Cottages at Overbury, 14.
Worcestershire, "Bibsworth" and "Col-
dicote," Centre Plates No. 500.
Workmen's Hostel and Club, Liverpool,
Supp. Dec. 28th, p. 18.
Works: Photo-printing, London, 335;
Singer's, Kilbowie, Supp. Dec. 28th,
p. 16.
Worsley Hall, Gates, Supp. Dec. 28th,
p. 26.
Wyke, Bradford, Schools at, Supp. Dec.
28th, p. 11.

YORK: "Black Swan" Inn, 71;
Shambles, 24.
York House, Water-gate, Centre Plate
No. 509.
Y-shaped Ward, Supp. Dec. 28th, p. 2.

ARTISTS AND AUTHORS.

ADAMS, H. PERCY, 128, 129, 304, 305, 306, Centre Plates Nos. 498 and 513, Supp. Dec. 28th, pp. 2, 7.
Adkin and Hill, Supp. Dec. 28th, p. 11.
Adshhead, S. D., Supp. Dec. 28th, p. 12.
Allen, E. J. Milner, and J. W. Simpson, Supp. Dec. 28th, p. 12.
Anderson, J. Macvicar, Supp. Dec. 28th, p. 16.
Anderson, W. J., 134, 135.
Anderson, Wills and, Supp. Dec. 28th, p. 8.
Archibald, S. G., 54.
Armstrong, C. M. O., 157.
Arnodin and Haynes, Supp. Dec. 28th, p. 28.
Ashbee, C. R., 27, Centre Plate No. 493.

BAILY, BREWILL and, 234, Centre Plate No. 508.
Baker, Masey and Sloper, Supp. Dec. 28th, p. 17.
Bakewell, W., Supp. Dec. 28th, p. 7.
Bale, M. Powis, 32.
Barnett, Haynes and Barnett, 285.
Barrows and Co., Ltd., 132.
Beaumont, J. W., 207.
Beare, Prof. T. Hudson, 290.
Beckett, J. H., 76.
Bedells, Lander and Crompton, Supp. Dec. 28th, p. 19.
Belcher, John, 251.
Bidlake, W. H., 227, Centre Plate No. 507, Supp. Dec. 28th, p. 6.
Black, Clayton and, Supp. Dec. 28th, p. 17.
Blomfield, Charles J., Centre Plate No. 494.
Bock, James K., 59, 60, 61, 62.
Bodley, G. F., Supp. Dec. 28th, pp. 2, 6.
Bolton, A. T., Supp. Dec. 28th, p. 18.
Bowles, E. Wingfield, 312, 313.
Bradshaw and Gass, Supp. Dec. 28th, pp. 10, 19.
Brangwyn, Frank, 15.
Brettingham, Maud, 40.
Brewill and Baily, 234, Centre Plate No. 508.
Brierley, Walter H., Centre Plate No. 506, Supp. Dec. 28th, p. 14.
Briggs and Wolstenholme, Hobbs and Thornely, Supp. Dec. 28th, pp. 17, 19.
Brooke, J., and **Edwin T. Hall**, Supp. Dec. 28th, p. 3.
Bryan, H. Dare, Supp. Dec. 28th, p. 17.
Brydon, J. M., Supp. Dec. 28th, p. 23.
Bulmer, G., 280.
Burkinshaw, Sheppard and, 29.
Burns Dick, Cackett and, Supp. Dec. 28th, p. 7.
Butler, Crouch and, and R. Savage, Supp. Dec. 28th, p. 8.

CACKETT and BURNS DICK, Supp. Dec. 28th, p. 7.
Campbell, John C., Supp. Dec. 28th, p. 16.
Capper, Professor, 329.
Caroe, W. D., Supp. Dec. 28th, pp. 13, 23.
Carrère and Hastings, Centre Plate No. 512.
Carron Co., 77.
Carter, C. P., 22, 24.
Cash, John, 28.
Castle, Sydney E., Centre Plate No. 495.
Catlow, Goddard, Paget and, Supp. Dec. 28th, p. 7.
Cave, Walter, Centre Plate No. 492, Supp. Dec. 28th, p. 9.
Cheetham, F. H., 11.
Chessum and Sons, 125.
Chessterton, F. S., 35, 279, Centre Plates Nos. 493 and 511.
Chisholm, Sir Samuel, 63.
Clayton and Black, Supp. Dec. 28th, p. 17.
Coleman, T. E., 20.
Colclutt, T. E., 14; and **Stanley Hamp**, Supp. Dec. 28th, p. 18.
Collins, H. H. and M. E., Supp. Dec. 28th, p. 2.
Comyn, Heaton, Centre Plate No. 497, Supp. Dec. 28th, p. 12.
Constantine and Cox, 30.
Cooper, Henman and, Supp. Dec. 28th, p. 2.
Cooper, T. E., Centre Plate No. 491.
Cooper, C. J. Harold, 58, Centre Plates Nos. 495 and 496.
Cooper, Russell and, Supp. Dec. 28th, p. 11.
Core, F., Centre Plate No. 509.
Corlette, Nicholson and, Supp. Dec. 28th, p. 15.
Cox, Constantine and, 30.
Cox, Trimmell and Davison, Supp. Dec. 28th, p. 7.

Cranfield Sydney W., 101, Supp. Dec. 28th, p. 13.
Crawford, Dr. R., 63.
Crompton, Lander, Bedells and, Supp. Dec. 28th, p. 19.
Cross, A. W. S., Supp. Dec. 28th, p. 8.
Crouch and Butler and R. Savage, Supp. Dec. 28th, p. 8.
Crutwell and Andrew Murray, Supp. Dec. 28th, p. 24.
Cutler, W. E., 61.

DAVISON, RAFFLES, 317.
Davison, T., Supp. Dec. 28th, p. 9.
Davison, Cox, Trimmell and, Supp. Dec. 28th, p. 7.
Dawber, E. Guy, 16, 175, Centre Plates No. 500.
Deacon and Horsburgh, Supp. Dec. 28th, p. 6.
Dickinson, Fermaud and, 72.
Dockree, E., 203.
Dodd and Dodd, 167.
Downing, H. P. Burke, Supp. Dec. 28th, p. 6.
Doyle, J. Francis, Supp. Dec. 28th, p. 18.
Drew, Sir Thomas, Supp. Dec. 28th, p. 4.
Drew-Bear, Perks and Co., Ltd., 216, 217, 220, 314, 315, 318, 319, Centre Plates No. 514.
Dunbar, Professor, 67.
Dunn, W., 275.

EASTWOOD, J. H., Supp. Dec. 28th, p. 4.
Eaton, W., 2.
Eccles, Woolfall and, Supp. Dec. 28th, p. 16.
Edwards, F. E. P., and **R. Norman Shaw**, Supp. Dec. 28th, p. 8; and **James Ledingham**, same, p. 12.
Emanuel, Frank L., 54, 55, 56.

FALKNER, NIVEN and WIGLESWORTH and, 202, 203, 204, 205, Centre Plates Nos. 497 and 502.
Fermaud and Dickinson, 72.
Field, Horace, 45, Supp. Dec. 28th, pp. 15, 17.
Fletcher, Hanslip, 211, 212.
Flockhart, William, 136, 137, 138, Centre Plate No. 501.
Ford, Ernest Runtz and, and R. Norman Shaw, Supp. Dec. 28th, p. 18.
Fowler, C. Hodgson, Supp. Dec. 28th, p. 4.
Fowles, Dr. Gilbert J., 67.
Fraser, G., Supp. Dec. 28th, p. 21; and **Thornely**, same, p. 5.
Fulleylove, John, 189.

GABRIEL, E., Supp. Dec. 28th, p. 11.
Gass, Bradshaw and, Supp. Dec. 28th, pp. 10, 19.
Gauld, W. E., 177.
George, Major C. A., 233.
George and Yeates, 197, 284.
Gibbs, E. M., 313, Supp. Dec. 28th, p. 13.
Gibson, J. S., 330.
Gilbert, Cass, Centre Plate No. 512.
Gilchrist, Charles R., 80.
Gilford, H., Supp. Dec. 28th, p. 10.
Gillespie, Salmon and Son, and, Supp. Dec. 28th, p. 3.
Goad, Charles E., Supp. Nov. 23rd, p. 8; Supp. Dec. 21st, pp. 24, 25.
Goddard, Paget and Catlow, Supp. Dec. 28th, p. 7.
Gordon, W. S. A., 17, 42, 43, 44, 47, 71.
Graham, Morton and Co., Ltd., 19.
Griggs, F. L., 66.
Grocock, Malloes and, 66.
Grundy, H. H., 238.
Gunn, E., Supp. Dec. 28th, pp. 14, 21.

HALL, E. T., Supp. Dec. 28th, pp. 1, 3.
Hall, G. A., Centre Plate No. 508.
Hall, R. N., 99.
Hamp, Stanley, and T. E. Colclutt, Supp. Dec. 28th, p. 18.

Hardwick, A. J., 103, 152, Centre Plates Nos. 498 and 501, Supp. Dec. 28th, p. 21.
Hare, Henry T., 115, Centre Plate No. 499, Supp. Dec. 28th, p. 8.
Harrington and Ley, Centre Plate No. 505.
Harrison, Hall and Moore, Supp. Dec. 28th, p. 26.
Hart, A. H., and **Waterhouse**, Supp. Dec. 28th, pp. 14, 21.
Harvey, W. Alex., Supp. Dec. 28th, p. 11.
Hathern Station Brick and Terra-Cotta Co., Ltd., 218, 219.
Hay and Henderson, 329.
Haynes and Arnodin, Supp. Dec. 28th, p. 24.
Healing and Overbury, Supp. Dec. 28th, p. 21.
Heathcote, Charles, and Sons, 22, 75.
Hedges, Killingworth, 110.
Hempstead Patent Brick Co., 104, 105.
Henderson, Hay and, 329.
Henman, W., 261.
Henman and Cooper, Supp. Dec. 28th, p. 2.
Henry, J. Macintyre, Supp. Dec. 28th, p. 8.
Herts and Tallant, 31.
Hewitt, Walter, E., Centre Plate No. 492.
Hill, Adkin and, Supp. Dec. 28th, p. 11.
Hillman, W., 63.
Hiorns, F. R., Centre Plate No. 491.
Hobbs and Thornely, Briggs and Wolstenholme, Supp. Dec. 28th, pp. 17, 19.
Holloway Brothers, 190, 191.
Holtom, E. G., 253.
Horder, P. Morley, 256-263, Centre Plates No. 510.
Hornblower, George, 143, Centre Plate No. 501, Supp. Dec. 28th, p. 15.
Horsburgh, Deacon and, Supp. Dec. 28th, p. 6.
Horsley, Gerald C., Supp. Dec. 28th, p. 11.
Horth, Frederic J., Supp. Dec. 28th, p. 12.
Hubbard and Moore, Supp. Dec. 28th, p. 13.
Hunt, W. G., Supp. Dec. 28th, p. 9.
Hutchinson, J., Supp. Nov. 23rd, p. 4.

I'ANSON, E. B., Supp. Dec. 28th, p. 1.
Innocent, C. F., 28, 240.

JACKSON, T. G., 340, Supp. Dec. 28th, p. 7.
Jennett, A. R., 70, Centre Plate No. 496.
Job, Robert, 126.
Johnson and Webber, 336.
Jones, W. Campbell, Centre Plates Nos. 503 and 507, Supp. Dec. 28th, p. 14.
Jong, F. de, and Co., 242.
Jopling, J., 331, 341.

LAMB, E. B., 100; and **John P. Seddon**, Supp. Dec. 28th, p. 2.
Lanchester, Stewart and Rickards, Supp. Dec. 28th, p. 22.
Lander, Bedells and Crompton, Supp. Dec. 28th, p. 19.
Lander, Dr., 268.
Ledingham, James, and F. E. P. Edwards, Supp. Dec. 28th, p. 12.
Leeming and Leeming, Supp. Dec. 28th, p. 19.
Lightning Research Committee, 157.
Lindley, W. H., 281.
Link, Theodore C., 285.
Littlewood and Mahomed, 335.
Long, Walter, 279.

MACALISTER and TENCH, 178, Centre Plates Nos. 500 and 504.
McAlpine, R., and Sons, Supp. Dec. 28th, p. 16.
MacCarthy, C. J., Supp. Dec. 28th, p. 4.
McGibbon, Alexander, 306.
Mackenzie, A. Marshall, and Son, Supp. Dec. 28th, p. 18.
Mahomed, Littlewood and, 335.
Malloes and Grocock, 66.
Mann, J., 289.
Marshall, W. C., Supp. Dec. 28th, p. 11.
Martin, Treadwell and, Supp. Dec. 28th, p. 3.
Masey, Baker and Sloper, Supp. Dec. 28th, p. 17.
Masqueray, E. L., Centre Plate No. 512.
Matcham and Co., Frank, 216-223, 242-246, 312-319, Centre Plates No. 514.

Matear and Simon, Supp. Dec. 28th, p. 19.
Meik, P. W. and C. S., 247, 248, 249, 250.
Merryweather and Sons, Supp. Dec. 21st, p. 32.
Mewes and Davis, 236, 237, 238, 286-231, Centre Plate No. 512.
Micklethwaite, J. T., 294.
Mitchell, Arnold, Centre Plates Nos. 493 and 499.
Mitchell, G. S., 90.
Montagu, Scott, 301.
Montelius, Prof. Oscar, 99.
Moore, Leslie T., Centre Plate No. 495.
Moore, Hubbard and, Supp. Dec. 28th, p. 13.
Moreland, Richard, and Son, Ltd., 222, 223.
Morley, John G., 59-62.
Morphew, Reginald, 89, Centre Plate No. 497.
Morton, G. H., 220.
Mouchel, L. G., 247, 248, 249, 250, 275.
Muirhead, T., Supp. Dec. 28th, p. 1.
Murray, Andrew, and Crutwell, Supp. Dec. 28th, p. 24.

NEILL and SON, A., Supp. Dec. 28th, p. 16.
Newcombe, Sydney, 178.
Newton, Ernest, 14, Supp. Dec. 28th, pp. 13, 14.
Newton, E. B. B., 162, 180.
Nicholson, Sir Charles A., Centre Plates Nos. 504 and 506.
Nicholson and Corlette, Supp. Dec. 28th, p. 15.
Nicholson, A. D., Supp. Dec. 28th, p. 12.
Niven and Wigglesworth and Falkner, 202, 203, 204, 205, Centre Plates Nos. 497 and 502.
Nobbs, Percy E., 57.
Nordmann, C., 183.
Norton, Professor, 15.

OSBORNE, JOHN P., Supp. Dec. 28th, p. 8.
Overbury, Healing and, Supp. Dec. 28th, p. 21.

PAGET, GODDARD and CATLOW, Supp. Dec. 28th, p. 7.
Paget, John C., 108.
Pain, Wood-Hill and, 337.
Painter, H. Eaton, 122, 123.
Parr, L. M., 336.
Parsons, Hon. C. A., 99.
Peach, O. Stanley, Supp. Dec. 28th, p. 16.
Pearson, J. L., Supp. Dec. 28th, p. 5.
Petrie, Professor, 99.
Pite, Beresford, Supp. Dec. 28th, p. 6.
Plumbe, Rowland, and Harvey, Supp. Dec. 28th, p. 3.
Potts and Co., 236, 237, 238, 286-211, Centre Plate No. 512.
Prentice, A. N., Supp. Dec. 28th, p. 14.
Prior, E. S., Supp. Dec. 28th, p. 11.

RAINE, H., Centre Plate No. 507.
Ransomes and Rapier, Ltd., 312, 313.
Reay, Silcock and, Supp. Dec. 28th, p. 14.
Renon, M., 323, Centre Plate No. 514.
Richardson, Clifford, 139, 154.
Rickards, Lanchester, Stewart and, Supp. Dec. 28th, p. 22.
Ridge, Lacy W., 330.
Robinson, Percy, 134.
Robson, Philip A., 150, 151, Centre Plate No. 502.
Ross, D. J., Supp. Dec. 28th, p. 7.
Runtz and Ford, Supp. Dec. 28th, pp. 18, 26.
Russell and Cooper, Supp. Dec. 28th, p. 11.
Ryan-Tenison, A. H., Supp. Dec. 28th, p. 11.

SACHS, EDWIN O., Centre Plates No. 505.
Salmon and Son and Gillespie, Supp. Dec. 28th, p. 3.
Sandilands, Thomson and, Centre Plate No. 515.

Savage, Crouch and Butler and, Supp. Dec. 28th, p. 8.
Schmidt, Herr, Supp. Nov. 23rd, p. 16.
Scorer, George O., 30.
Scott, E. Kilburn, 188.
Scott, J. Oldrid, Supp. Dec. 28th, p. 4.
Seddon, John P., and E. B. Lamb, Supp. Dec. 28th, p. 2.
Shanks, W., 67.
Shaw, R. Norman, and F. E. P. Edwards, Supp. Dec. 28th, p. 8; and Ernest Runtz and Ford, same p. 18.
Sheen, Stanley and Co., Supp. Dec. 28th, p. 26.
Sheppard, G. Lewis, 153, 174, 175, 176.
Sheppard, J., Supp., Dec. 21st, p. 1.
Sheppard and Burkinshaw, 29.
Silcock and Reay, Supp. Dec. 28th, p. 14.
Simon, Matear and, Supp. Dec. 28th, p. 19.
Simpson, F. M., Supp. Dec. 28th, p. 12.
Simpson, J. W., Centre Plate No. 494;
and E. J. Milner Allen, Supp. Dec. 28th, p. 12.
Skipper, G. J. and F. W., Centre Plate No. 491.
Sloper, Baker, Masey and, Supp. Dec. 28th, p. 17.
Smart, Professor, 99.
Smith and Stevens, 315.
Smith, E. Shrapnell, 63.
Suell, A. Saxon, Supp. Dec. 28th, p. 3.
Soutar, Charles G., 184.
Steward, H. T., 277.
Stokes, Leonard, 16.

Stuart's Granolithic Stone Co., Ltd., 329.
Stubbs, Edwin J., Centre Plates No. 516.
Swan, James A., 7, 124.
Swarbrick, John, Centre Plates Nos. 503 and 509.

TAIT and HARVEY, Supp. Dec. 28th, p. 3.
Tallant, Herts and, 31.
Taylor, J. Walton, 291.
Taylor, John Knox, 285.
Tench, Macalister and, 178, Centre Plates Nos. 500 and 504.
Thicknesse, Willink and, Supp. Dec. 28th, p. 6.
Thickpenny, C. R., 233.
Thomas, A. Brunwell, Supp. Dec. 28th, p. 8.
Thomas, Walter W., 276.
Thomson and Sandilands, Centre Plate No. 515.
Thornely and Fraser, Supp. Dec. 28th, p. 5.
Thornely, Hobbs and, and Briggs and Wolstenholme, Supp. Dec. 28th, pp. 17, 19.
Thornton, E., 298-303, Centre Plates No. 513.
Treadwell and Martin, Supp. Dec. 28th, p. 3.
Trimnell, Cox and Davison, Supp. Dec. 28th, p. 7.

Trubshaw, C., Supp. Dec. 28th, p. 19.
Turneure, Prof. E. E., 193.

VAN BRUNT and HOWE, Centre Plate No. 512.
Voysey, C. F. A., 265, 270, 271, 272, Centre Plate No. 492.

WALDSTEIN, PROF., 283.
Walker, E., 326, 327.
Ward, Thomas W., Ltd., 119.
Waring-White Building Co., 164, 165, 235, 236, 237, 238, 286-291, Centre Plate No. 512.
Warren, Gerald, 230, 231, 232, Centre Plate No. 508.
Warren, E. P., 166, 251, 294, Centre Plates Nos. 503 and 509.
Waterhouse, Paul, Centre Plate No. 508.
Webb, J. H., 230.
Webb, Sir Aston, 15, Supp. Dec. 28th, pp. 11, 23.
Webber, Johnson and, 336.
Whistler, J. McNeill, Supp. Dec. 28th, p. 10.
Wicksteed, J. H., 110.

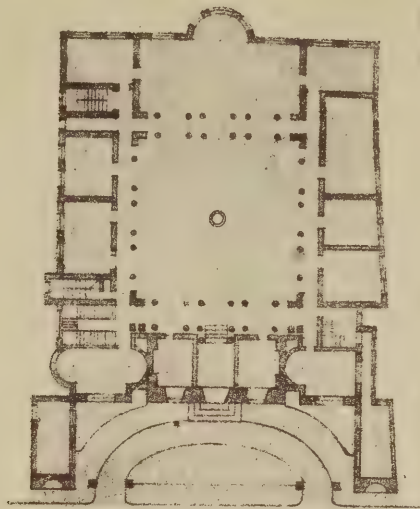
Wigfull, J. R., 303.
Wigglesworth, Niven and, and Falkner, 202, 203, 204, 205, Centre Plates Nos. 497 and 502.
Wilkes, J. S., 198.
Williams, Robert, 171, 172.
Willink and Thicknesse, Supp. Dec. 28th, pp. 6, 12.
Willoughby, Woodhouse, and Langham, Supp. Dec. 28th, p. 3.
Wills and Anderson, Supp. Dec. 28th, p. 8.
Wilson, H., 111.
Winder, T., 207.
Wolstenholme, Briggs and, Hobbs and Thornely, Supp. Dec. 28th, pp. 17, 19.
Wood, Edgar, Supp. Dec. 28th, p. 5.
Wood, L. S., 94, 95, 96, 97, 98.
Wood-Hill and Pain, 337.
Woodhouse, Willoughby and Langham, Supp. Dec. 28th, p. 3.
Woolfall and Eccles, Supp. Dec. 28th, pp. 16, 21.
Wragge, George, Ltd., Supp. Dec. 28th, p. 26.
Wyand, B., 50, 68, 125.

YATES, WALTER, 58.
Yeates, Ernest George and, 197.
Yorke, F. D. B., 253.

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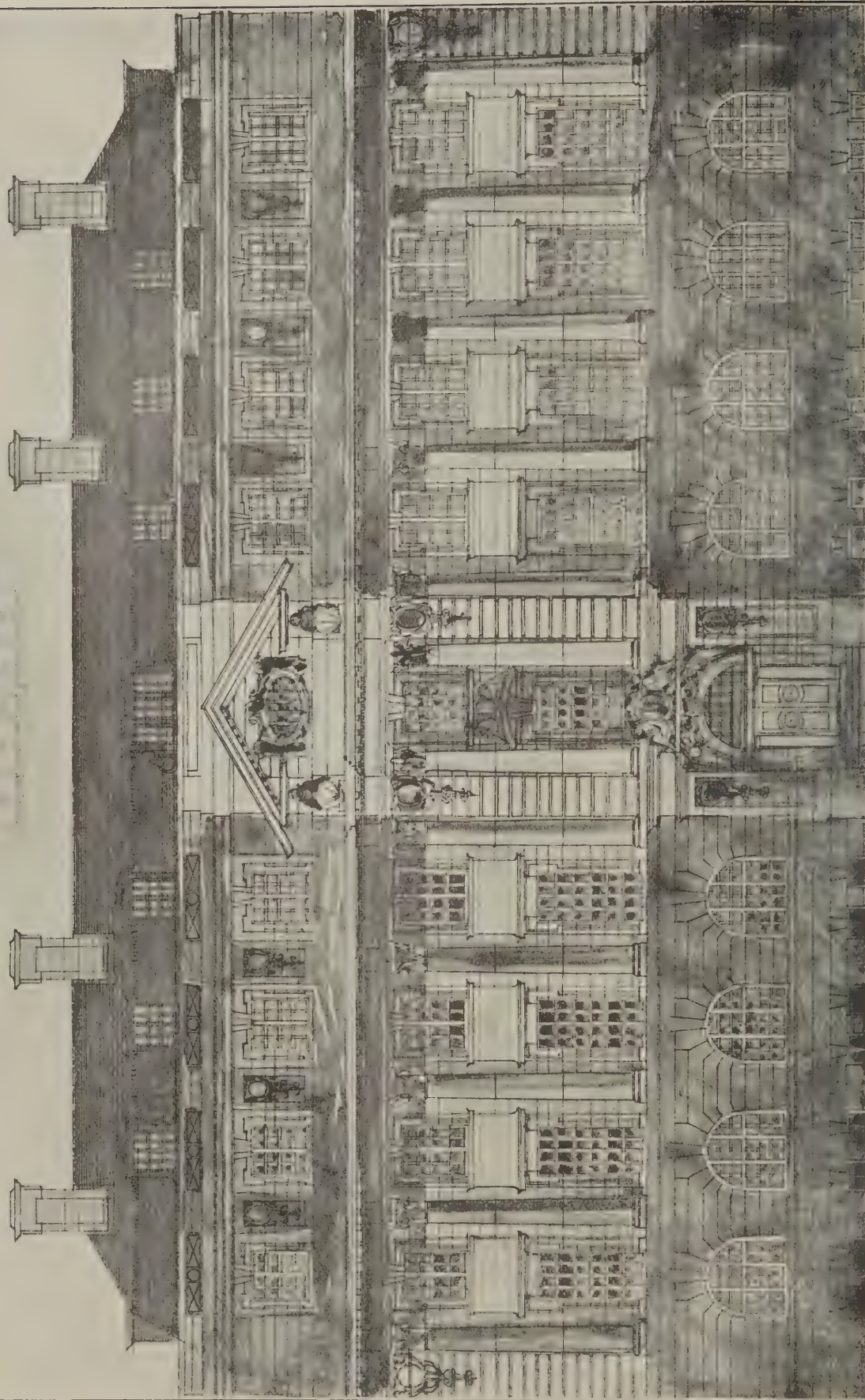
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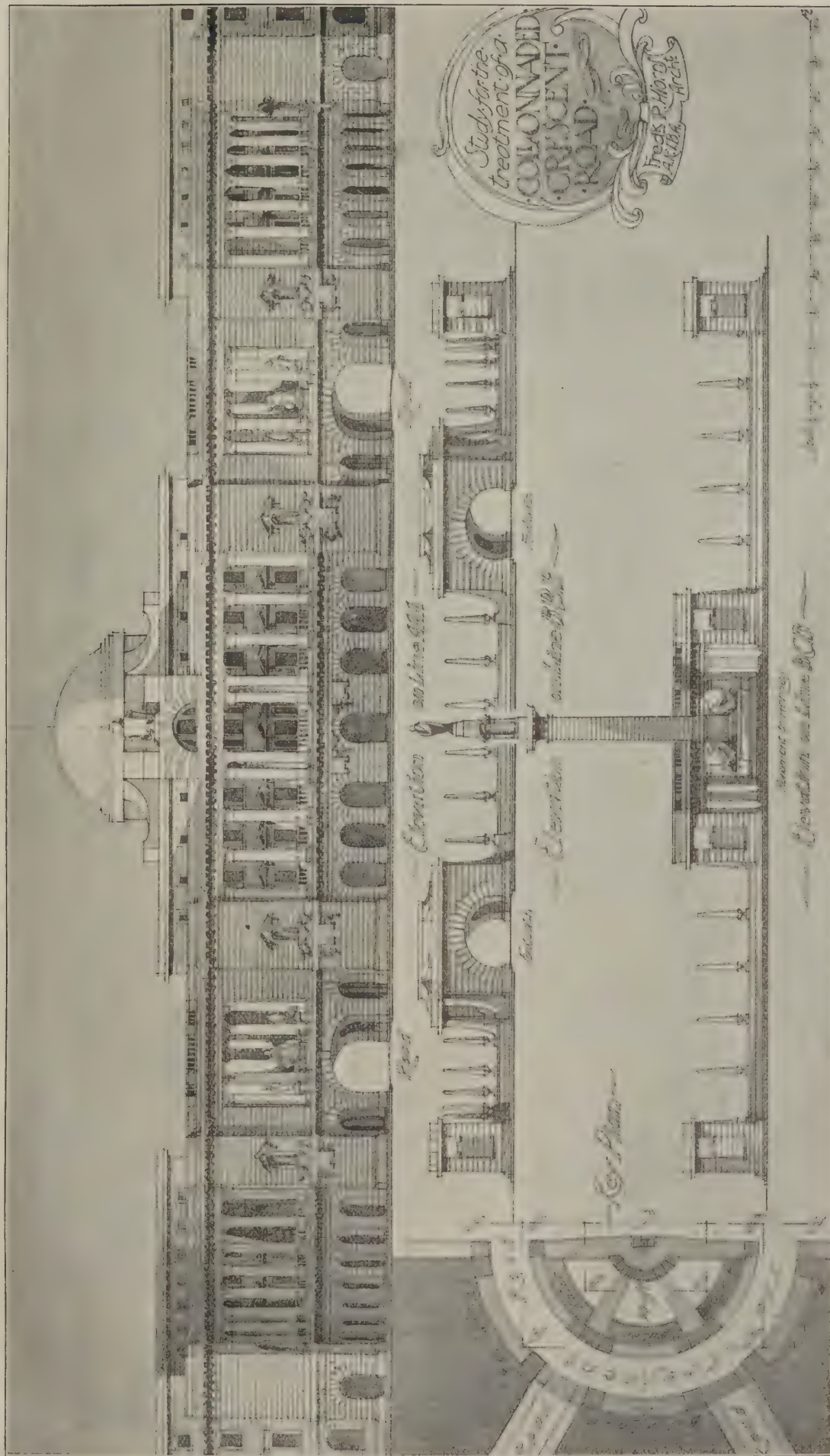
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(ROYAL ACADEMY EXHIBITION, 1904.)

Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, July 6th, 1904.



(ROYAL ACADEMY EXHIBITION, 1904.)

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

July 6, 1904. Vol. 20, No. 491.

6, Great New Street, Fetter Lane, E.C.

Summary.

The Board of Trade report shows that last year was comparatively free from industrial stoppages, the total number of building trade disputes having been only 44, affecting 3,663 operatives, as compared with 5,356 affected in 1902, 9,797 in 1901, 19,178 in 1900 and 30,524 in 1899. (Page 7.)

Messrs. Kirk & Randall's action against Sir Charles Wyndham concerning the question of bills of quantities and a lump-sum contract for completing the New Theatre has been remitted to an arbitrator with a direction from the Lord Chief Justice. (Page 8.)

Mr. Arthur Stratton and Mr. Ronald P. Jones have been appointed respectively lecturer and assistant lecturer in architecture at King's College, London. (Page 10.)

Judge Whitehorne has decided that the chimney is part of a house and the chimney-pot part of the chimney, and therefore to be taken into account in determining the height of a house under the Workmen's Compensation Act. (Page 8.)

A whole necropolis of the Middle Empire, representing a phase of Egyptian civilization before B.C. 2000, has been discovered at Beni Hasan. The objects found will be exhibited at Burlington House next week. (Page 6.)

A number of papers on interesting subjects will be read at the twenty-second congress of the Sanitary Institute, to be held at Glasgow from July 25th to 30th. (Page 10.)

The Liverpool Cotton Exchange competition has been won by Messrs. Matear & Simon, of Liverpool. The building is estimated to cost £150,000. (Page 10.)

At Messrs. Martin, Earle's Portland-cement works, Wickham, there are sixteen rotary kilns giving an output of 2,500 tons per week. These have been erected after a long series of experiments with an American kiln. (Page 9.)

A trade exhibition is to be held at Cape Town from November to February next. (Page 12.)

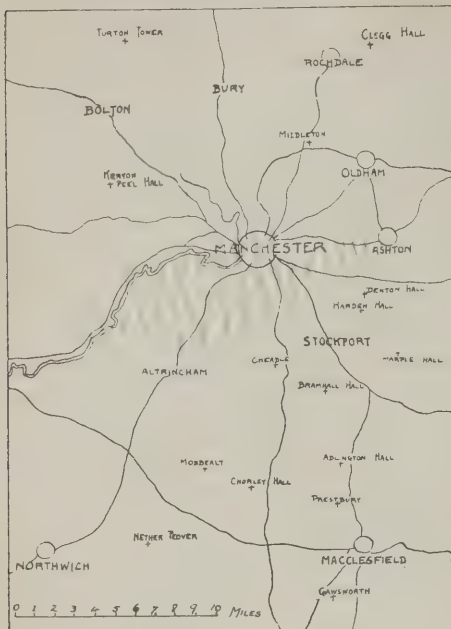
In the note-books of Nathaniel Hawthorne, the centenary of whose birth was celebrated on Monday, are to be found numerous interesting criticisms of architecture, such as, when speaking of Giotto's campanile at Florence, he says: "It is like a toy of ivory which some ingenious and pious monk might have spent his lifetime in adorning with scriptural designs and figures of saints; and when it was finished, seeing it so beautiful, he prayed that it might be miraculously magnified from the size of one foot to that of three hundred." (Page 11.)

The Index to Vol. 19 is now ready and can be obtained for 1d. post-free from the publisher.

Mr. Watts's Frescoes.

OPINIONS differ as to which are the greatest works of the late Mr. G. F. Watts. Thus we read in the "Morning Post" that "although his great performances as an imaginative artist will always rank high among works of their class, it is rather by his labours as perhaps the most successful portrait painter of the latter half of the nineteenth century that he will in the time to come be principally remembered," whereas the "Times" expresses the opinion that "Mr. Watts's portraits, fine and numerous as they are, occupy only a minor place in his life's production," his unique position being gained by "the great series of ideal pictures" which he produced. We would, however, pass by that matter of individual judgment and draw attention to his frescoes. Mr. Watts believed that fresco painting could exercise the most potent influence in raising the minds of the people to a higher appreciation of art generally, and, keeping that aim always in view, he devoted himself passionately to this branch of art during the early days of his career. His first important work was the cartoon of "Caractacus led in Triumph through the Streets of Rome," which gained for him the first prize of £300 in the competition for the decoration of the new Houses of Parliament. That this was a notable achievement may be judged from the fact that there were 140 competitors. The cartoon, however, was never carried out in fresco, for the Commissioners (much to their shame) actually disposed of it to a dealer, who cut it up and had the parts lithographed and sold wholesale as copies for schools. However, the prize money enabled Watts to visit Italy: and while there it is interesting to note that he painted a fresco on the walls of the famous Villa Careggi. During his absence a second competition for the decoration of the Houses of Parliament was held, in which he took no part, but when a third was announced in 1846 his generous patron, Lord Holland, induced him to compete, with the result that he again won the prize (£500) by his huge picture of "Alfred inciting the Saxons to prevent the Landing of the Danes," now in one of the committee-rooms. Shortly afterwards he was commissioned to paint St. George and the Dragon for the upper waiting hall in the House of Lords. This occupied five years, from 1848 to 1853. It still exists, though much damaged. His next fresco was the splendid conception decorating the west end of Lincoln's Inn Hall, entitled "Justice: a Hemicycle of Lawgivers." This fresco is 40ft. high and 45ft. long, and contains

thirty-three figures, those in the foreground being nearly double life-size: all the greatest lawgivers, from Moses to Edward I., are represented. Mr. Watts offered to paint it gratuitously, and though the Society accepted his offer they marked their appreciation of the noble public spirit which prompted it by presenting Mr. Watts with a purse of £500 and a cup. The artist, continuing in his generous work, next offered to decorate, without payment, the great hall at Euston Railway Station, asking only that the company should supply the scaffolding and colours. The subject was "The Progress of Cosmos," or the formation of the world. But the offer was declined, the directors expressing themselves unable to spend their shareholders' money on such an object; the architect, too, much alarmed, protested against this artistic invasion. Much as this was regretted at the time, it is well that the work was not carried out, remembering the atmosphere in which it would have been placed. Yet it almost concludes Mr. Watts's work as an artist in fresco, though he also painted one at the church of St. James-the-Less, near Vauxhall Bridge, and a large decorative work at the Marquis of Lansdowne's seat at Bowood, in Wiltshire, besides executing several mural designs in private houses; and, as being decorative work as distinct from pictures, we must not forget his mosaic designs for the dome of St. Paul's Cathedral, especially the St. John; whilst of his few works of sculpture we can only repeat the opinion that he might have been even greater with chisel than with his brush, as may be opined from the wonderful statue of "Physical Energy" now in the courtyard of Burlington House. In conclusion, one cannot omit reference to the personal modesty of this great artist. Mr. Watts twice declined a baronetcy from Mr. Gladstone, and it was only when His Majesty had the happy thought of founding the Order of Merit that Mr. Watts could be induced to accept such public honour: nor can one forget the exceptional tribute paid to him by the Royal Academy, who unanimously elected him a full member of their body without his knowledge or consent, a compliment never paid before to any artist in this country, and only likened to the honour conferred on Rosa Bonheur by the Paris Salon, who declared all her future works to be exempt from examination by the jury of admission. Of Mr. Watts's private life there is perhaps no more interesting story than that of his first marriage, with Miss Ellen Terry—a marriage shortly afterwards dissolved.



OLD BUILDINGS IN AND AROUND MANCHESTER.

By W. EATON, A.R.I.B.A.

MANCHESTER itself is anything but rich in architectural antiquities, containing as it does only two buildings of any such interest, but in the neighbourhood are to be found many old halls and churches which are well worthy of study, some of the old half-timbered halls possessing special interest and comparing favourably with similar work to be found in other parts of England.

Manchester Cathedral.

The cathedral is not of that size or magnificence one usually associates with a city of the greatness and importance of Manchester. It consists of a lofty tower, nave and choir, with north and south aisles, a Lady Chapel and octagonal chapter-house. The nave is exceptionally wide, as there are two outer aisles, both on the north and south sides, the piers presenting the appearance of a forest of columns when looking across the cathedral. Restorations and additions have been made at so many different times that very little if any of the original structure remains. The old tower was taken down and rebuilt from the designs of Mr. J. P. Holden in 1864; after this certain additions and alterations were made from the designs of Mr. Dawes; but the chief and most important restoration was carried out by the late Mr. Crowther, the galleries being taken away, the roof of the nave repaired, and the cement-work removed from the columns and walls. During these restorations the nave piers were found to be so weak as to necessitate rebuilding. A muniment-room and baptistery were also built from the designs of Mr. Crowther, the undertaking occupying ten years. It was most fortunate that the restorations and additions were completed before his death, as they constitute quite the most important work ever carried out in the cathedral and are a lasting monument to the architect's skill.

The west or Victorian porch, erected in 1900, was designed by Mr. Basil Champneys. Further building operations are now in progress at the south side of the cathedral, several vestries being added.

The style of the cathedral throughout is Perpendicular, with the exception of the arch opening into the Lady Chapel, which is of the Decorated period. In the year 1421 licence was granted by Henry V. to Thomas Lord de la Warre to collegiate the

parish church. The first warden, Sir John Huntingdon (1422-58), began the work of rebuilding on his appointment, and he is supposed to have built the choir and its aisles and the chapter-house. Langley is credited with the building of the nave, and Stanley is said to have rebuilt Huntingdon's choir and, in conjunction with Richard Beck (a Manchester merchant), to have erected the exquisite stall-work in the choir. The rood screen which divides the nave from the choir is a charming conception. It has three wide openings, with double doors in each. Above is the organ, the case of which was designed by the late Sir Gilbert Scott. But perhaps the most important and striking feature to be found in the cathedral is the magnificent tabernacle work of the stalls, which is of rich and intricate design. There are twelve stalls on each side and three on either side of the entrance from the nave at the back of the rood screen. Stalls similar in design are to be found at Beverley Minster and in some of the large churches in the north of England; but those at Manchester Cathedral will compare favourably in design and workmanship with any to be seen in England. The miserere carvings and the elbows of the stall ends and book desks are of elaborate design, bold and vigorous in detail and well worthy of study. There are also many fine screens in the church, notably that between the St. John the Baptist or Derby Chapel and the north aisle of choir. On either side of the opening to the Lady Chapel may be seen the rebus

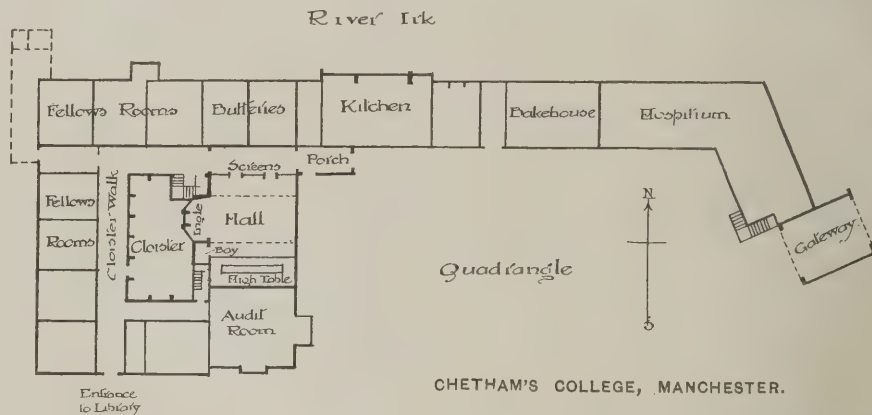
rock overhanging the River Irk, near where it joins the Irwell. The most interesting features are the large hall and the cloisters, the latter occupying three sides of a court and having a passage above them. A staircase at the north-west of the hall gives access to the corridor on the first floor, which leads to the governor's private apartments. This staircase contains a quaint though well-proportioned newel at the bottom, with cut balusters and handrail on either side of the steps, all in the Jacobean style. The plans of Chetham's College formed part of a set which were awarded the Pugin Studentship last year.

The Manchester Society of Architects also offered a prize some years ago for the best drawings of the College, to be competed for by students resident in Manchester.

Chetham's College is visited annually by thousands of people from all parts, and is considered to be one of the sights of Manchester. Standing as it does in the centre of a great manufacturing city, adjacent to several of the largest railway stations in the north of England, one is sincerely thankful that the buildings are in such an excellent state of preservation and have not been allowed to suffer at the hands of time, but have been carefully repaired as occasion required.

Ordsall Hall.

Ordsall Hall, which is situated at the end of Ordsall Lane, Salford, adjoining the River Irwell, has been greatly altered and restored from time to time, but still retains the old



CHETHAM'S COLLEGE, MANCHESTER.

of Sir John Huntingdon—on one side a hunting scene and on the other a tun or cask, for ton.

The exterior of the cathedral is by no means imposing and calls for little attention. It compares very unfavourably with the design and beauty of the interior. The Manchester Society of Architects have on two occasions offered prizes to students for measured drawings and essays on the building.

Chetham's Hospital.

Chetham's College or Hospital,* sometimes called the Baron's Hall, is in close proximity to the cathedral. It was founded by Humphrey Chetham, Esq., a member of a family of considerable antiquity in the county of Lancaster, and to which illustrious individual that county stands indebted for many splendid charities. He died in 1653 and was interred at the east end of the north aisle of the chancel in Manchester Cathedral. The buildings were bequeathed for use as a public library and a home for forty healthy boys of honest and industrious parents. Chetham's Hospital is now the home of one hundred boys, with their caretakers, and a library of 60,000 volumes. It was formerly called the Blue Coat School, the boys being dressed in long blue coats, yellow stockings and a cap. It occupies one side of a large court or quadrangle, and is situated on a

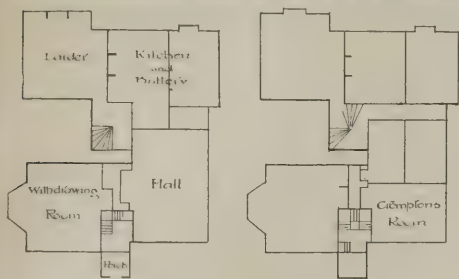
banqueting hall, which contains a beautiful open-timbered roof of good design, together with well-proportioned screens. It has already been described in these pages.*

Hall-i-th'-Wood, Bolton.

Hall-i-th'-Wood,† which is situated at Tonge Moor, Bolton, about ten miles from Manchester, is a charming building, part of it being in the half-timbered style, the other portion being constructed of stone. It will always be famous as having been the residence of Sam Crompton, the inventor of the spinning mule. Its name is rather misleading, as at the present time the house abuts upon a winding roadway paved with setts, there being scarcely a tree about the building. The original block is to the road, the walls being constructed of wattle and daub—that is, green twigs threaded between stouter uprights and thickly covered with chopped straw. In one of the rooms the wall has been stripped in order to show the construction. From old manuscripts it appears that in 1547 a Laurence Brownlow owned and occupied the place, being succeeded by his son Roger, who in turn left the property to his son Laurence in 1577. It was this Laurence Brownlow who built the north-west wing. Over the fireplace in one of the rooms of this wing is a stone bearing the

* Described and illustrated in THE BUILDERS' JOURNAL, July 31st, 1901.

* January 21st, 1903.
† Illustrated in THE BUILDERS' JOURNAL, July 9th, 1902.



GROUND FLOOR PLAN FIRST FLOOR PLAN
HALL-WITH-WOOD, BOLTON.

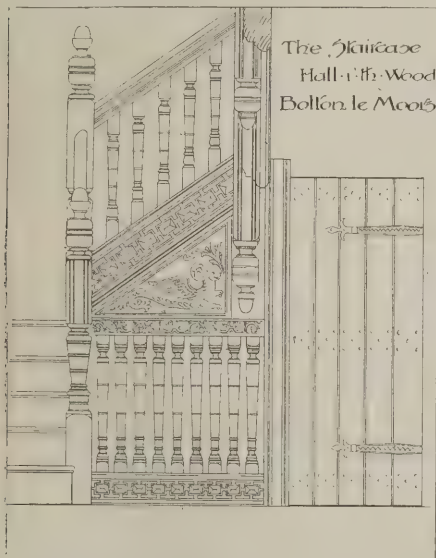
inscription, **B** 1591, being the initials of himself and wife.

Over the south porch, and also on the head of a water-spout near, is another set of initials:—

N
A A
1648.

These are the initials of Alexander Norris, son and heir of Christopher Norris, of Tonge, who erected this portion of the hall and added the beautiful oak staircase adjoining the porch.

Hall-with-Wood is now fitted up as a museum, and was presented to the town of

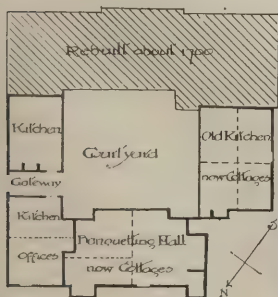


Bolton by W. H. Lever, Esq., M.P. One room has been furnished to represent a sitting-room and bedroom of the sixteenth and seventeenth centuries, whilst another contains articles once belonging to the Crompton family. The buildings are in a good state of preservation, having been carefully restored by Messrs. Grayson, Ould & Simpson.

To the north-east of Bolton is Rochdale, which contains on its outskirts two fine old halls:

Bellfield Hall and Clegg Hall.

Bellfield Hall has a long low appearance, this being chiefly due to its great width of mullioned windows. It adjoins the ancient village of Newbold. It is constructed of stone in long thin courses,



BELLFIELD HALL: ENTRANCE FRONT.



THE GATEHOUSE, KENYON PEEL HALL.

well bonded at the angles with ashlar quoins of large size, which give the work the appearance of great strength and solidity. It is one of the very few halls in Lancashire on the quadrangular plan. It was built at various times, but chiefly during the reigns of Henry VIII. and James I. The ancient banqueting hall has windows of enormous size, with six-

William Assheton about the latter part of the reign of Queen Elizabeth. It is illustrated in Gotch's "Early Renaissance Architecture."

Turton Tower.

About four miles to the north of Bolton is Turton Tower. This is a picturesque looking building consisting chiefly of a massive battlemented stone tower three storeys high,



CLEGG HALL.

teen lights in width. A number of the rooms are now divided by brick walls and used as cottages.

Clegg Hall is an unusual type of house, and differs very much from the other halls to be found in Lancashire. It is very lofty, possesses many gables, and stands in a commanding position, having been built by

built of rubble walling 5ft. thick, with heavy quoins at the angles. The east front of the building is half-timbered and contains the entrance hall. The house was rebuilt by William Orrell, Esq., in 1596. In 1628 the house and lands were purchased from the last of the Orrells by Humphrey Chetham, the founder of the Manchester College and Library.

Kenyon Peel Hall.

About midway between Bolton and Manchester is Kenyon Peel Hall, built in 1634. It is half-timbered and of irregular shape, with a central porch and side wings.

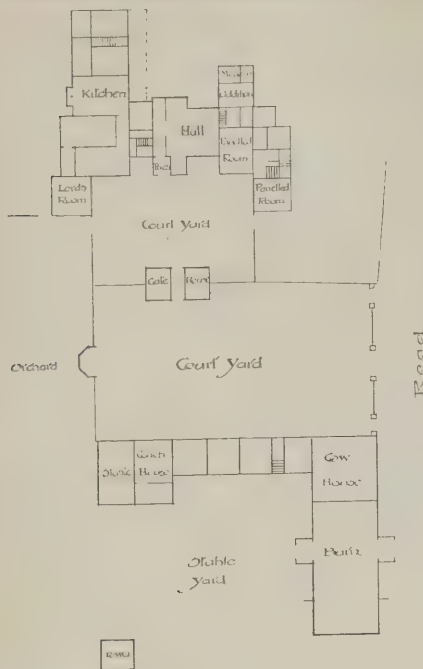
Most of the rooms are low, but lined with oak panelling and enhanced with several fine chimney-pieces. The gateways out of the quadrangle have picturesque gables bearing dates 1631 and 1634. There is an illustration of one of these in Gotch's "Early Renaissance Architecture."

On the gatehouse door is carved:

R Peace be within

G.B. These walls 1637.

The gatehouse is of good design



KENYON PEEL HALL.

with well-proportioned mullioned windows and a picturesque bell-cote. Its first floor is supposed to have been used as a court-room.

Middleton Church.

Midway between Rochdale and Manchester is Middleton, which possesses a fine parish church dedicated to St. Leonard. It is of great antiquity, but there are no records to fix the date of its original foundation. A church existed here in the early part of the reign of Henry III., but the greater part appears to have been built in 1524 by Ricardus Assheton, as indicated by an inscription on the south side of the building. The church consists of nave with north and south aisles and porch, chancel with vestry, and a massive tower at the west end of the nave, this being surmounted by a wooden four-gabled roof, with louvred openings at each side, giving the tower a somewhat picturesque appearance. There is a beautiful oak screen separating the nave from the chancel, which contains some bold and luxuriant carving interspersed with the arms of alliance of the Asshetons. There is also some excellent carving to the organ screen, and one or two good bench ends which are worth sketching. At the west end of the church supporting the



MIDDLETON CHURCH TOWER.



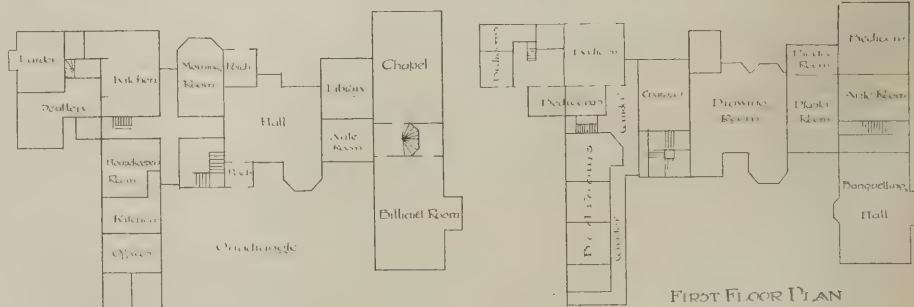
DENTON HALL.

east wall of the tower is a Gothic arch built up with vousoirs containing Norman detail. The south porch is of good design, but owing to it being in such an exposed position the stonework is crumbling away and the detail of the carving and mouldings is not very clear. There is a stained-glass window at the south end of the chancel which is of good design and pleasing colour; it represents a procession of archers on their way

by a floor in order to provide sleeping apartments for the occupants. There is a good chimneypiece in the hall enriched with herring-bone brickwork over the top, and battlemented. The projecting bay over the front entrance appears to have been at one time the minstrels' gallery. Near Denton Hall is the half-timbered church of Saint Lawrence, which at one time contained some interesting old carving to the bench ends.



BRAMHALL HALL.



FIRST FLOOR PLAN

Bramhall Hall.

This hall is one of the finest half-timbered structures in the country, and may be said to rival Moreton Hall* in beauty and diversity of design. It lies to the south of Stockport and is about two miles from Davenport Station, being commandingly situated and presenting a charming appearance from the road. Although not surrounded by a moat, it occupies a naturally defensive position, a small rivulet

to Flodden Field, led by Richard Assheton and their priest. Drawings of this church were submitted some years ago for one of the prizes offered by the Royal Institute of British Architects, but the competitor was not successful.

Denton Hall.

About four miles to the south-east of Manchester is Denton Hall, a half-timbered structure of fine proportions. In front of the hall are the farm buildings, which form a quadrangle. The hall itself has a good timbered roof, but has been divided in height

* Described and illustrated in THE BUILDERS' JOURNAL, January 8th, 1902.

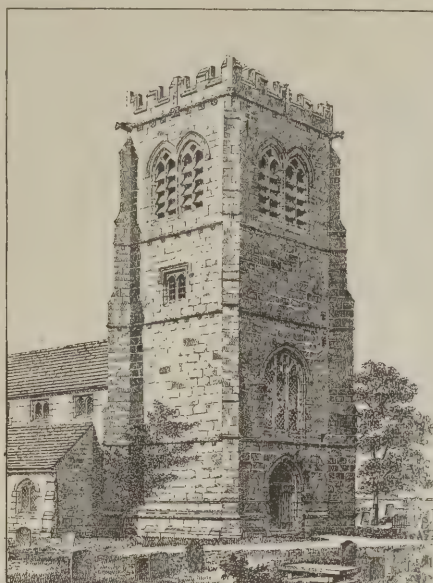


MARPLE HALL.

running at the foot of the hill on which the hall stands. The present buildings are shaped on plan, the west side, which helped to form the quadrangle, being missing. Ormerod in his "History of Cheshire" dates Bramhall at 1483 to 1485, but the date 1599 occurs in many places in the house. Habershon in his "Ancient Half-Timbered Houses of England" gives the date as 1592. Bramhall belonged for generations to the Davenport family. Extensive alterations and restorations have been made of late years. Externally, gables have been added to some of the bays, and the old chimneys, which were in a dilapidated condition, have been pulled down and rebuilt in a style in keeping with the architecture of the building. Bramhall Hall is one of the buildings mentioned in the Kalendar of the Institute of British Architects as being worthy of illustration for the Measured Drawings Medal.

Arden Hall.

Arden or Harden Hall, about two miles from Stockport, is splendidly situated, overlooking the fine valley of the Tame. It is surrounded by a moat which was full of water a few years ago. It was originally a half-timbered building, but in 1597 the northerly side of the quadrangle was rebuilt. Unfortunately the place has been allowed to fall into ruins, the only part of interest being the tower, which is square at the base and finishes octagonally at the top. It is similar in design to the tower at Plas Mawr in Wales, and has an Italian appearance. The hall itself appears to have been about 35ft. long, 24ft. wide, but only 12ft. high, the ceiling being constructed of heavy moulded oak beams. To the south



MOBBERLY CHURCH TOWER.

are the farm buildings, which have some half-timbered gables.

Cheadle Church.

About two miles to the south of Stockport is Cheadle, which contains the church dedicated to St. Mary, consisting of a massive tower at the west end, a nave with two side aisles having private chapels at the east end of each, and a chancel without side chapels. It contains no very early architecture, having been entirely rebuilt about the beginning of the sixteenth century. At the east end of the south aisle is a private chapel, called the Brereton or Handforth Chapel, which contains the full-length effigies of three knights on raised altar tombs, all probably connected with Handforth Hall, the latest being Sir Thomas Brereton, of Handforth, the last of the family. There are two other effigies dating from the fifteenth century. The church has a very fine oak roof, with carved bosses at the intersection of the ribs, supported by brackets of peculiar shape. There is also a beautiful rood screen, with some good tracery in the upper portion and some curious carving on the middle rails.

Marple Hall.

To the south-east of Stockport, between Disley and Marple, is Marple Hall, a good specimen of domestic architecture. It is strongly situated on the edge of a hill, and is thickly covered with ivy, which gives it a charming appearance. There are extensive stables and offices surrounding the hall, built of red sandstone. These stables bear the date of erection and have stepped gables containing a peculiarly shaped clock.



THE OLD VICARAGE, PRESTBURY.

Mobberly Church and Old Hall.

About fifteen miles to the south of Manchester is the village of Mobberly, which possesses a fine church consisting of nave with north and south aisles, south porch, chancel with vestries, and a massive stone tower at the west end. This tower, although it does not possess any elaborate detail, is of fine and bold proportions. It is four stages in height, these being emphasized by moulded strings, enriched with ornaments consisting chiefly of the Tudor rose, bosses with shields and grotesque heads—all in bold relief. The tower, which is about 65ft. in height, contains a fine peal of bells, on one of which is cast the following inscription: "I, to the church, the living call, I to the grave do summons all." The roof principals are of good design and are enriched with sculptured figures. The rood screen, one of the finest in the county, has good detail, the soffit being enriched by quatrefoils with interlacing tracery. The church was restored about fifteen years ago by the late Mr. Crowther, when the chancel was rebuilt and a new vestry added on the north side. The Manchester Society of Architects some years ago offered a prize for measured drawings of the building.

Not far from the church is Mobberly Old Hall, which exhibits some interesting features. The bay window is of good proportion, with moulded mullions and transoms, and the doorway at the side contains some interesting detail. There are also some good rainwater heads about the buildings.

Nether Peover Church.

About four miles from Mobberly is Nether Peover Church, near Plumley Station. It is constructed of timber and plaster, with the exception of the tower, which is of stone. The nave and chancel are 20ft. wide, and together consist of six bays, with corresponding north and south aisles and a south porch. The arcading to nave is supported by massive oak posts having moulded caps and stone bases. These posts support the tie-beams of the roof principals, which are enriched with sunk tracery.

Prestbury Church.

To the south-east of Mobberly is Prestbury, a quaint little village not far from Macclesfield. It possesses a church of great interest. The tracery in some of the windows is of peculiar form. At the junction of the nave and chancel is a "Sancte bell" gable which is rather uncommon. The tower is of simple though pleasing design.

On the south side of the church, a little distance away, is a small chapel of Norman design which is enriched with sculptured figures. The building is largely enveloped with ivy, which to some extent prevents the



NAVE ROOF CHEADLE CHURCH.



GAWSWORTH CHURCH.

detail from being seen. Opposite the church on the other side of the road is a half-timbered structure of quaint design, with picturesque gables, which is supposed to have been a priest's house at one time, but is now the vicarage.

Gawsworth Church.

a few miles from Macclesfield, is beautifully situated on the edge of a lake. It consists of a lofty tower of good proportions, and nave and chancel of equal width without aisles. There are evidences that the walls and roof were covered at one time with paintings. Near the church is the rectory and the Old Hall, half-timbered structures well worthy of a visit.

Alderley Church.

To the west of Gawsworth, but within easy distance, is Alderley, which possesses an interesting old church with a tower somewhat similar in design to that of Mobberly Church. The Chapel of the Lord has a staircase of stone outside the building. The church is hung with shields bearing the Stanley arms and the arms of the family alliances. Not far away is

Chorley Hall.

a building of charming appearance abutting on the main road. It is partly half-timbered, the remaining portion being built of stone. There are one or two well-proportioned mullioned windows. Some of the rooms are panelled in oak and a good chimney-piece is to be seen in one of them.

Adlington Hall.

Near Macclesfield is Adlington Hall, which

was built in 1505 and enlarged in 1851. It is the ancient home of the Leighs, of Civil War fame. The building is chiefly of black and white construction. The two-storey porch in the courtyard is well proportioned. On it is an inscription: "Thomas Leyghe Esquyer made this building in the year of our Lord God 1581," &c. &c. The great hall is of fine proportions, with some good carving to the screens and moulded work to the roof-timbers.

Most of the old buildings mentioned in this article are described in Mr. H. Taylor's "Notes on a Sketching Tour," a charming little publication; and the old halls are fully illustrated and described in his valuable work, "The Old Halls of Lancashire and Cheshire."

[Besides the articles in the *THE BUILDERS' JOURNAL* already mentioned is one on "Lesser Lancashire Halls" (Lydiat, Hurleston, Mawdesley, &c.) in the issue for February 4th, 1903, and one on "Ancient Halls of East Lancashire" (Samlesbury, Mytton, Martholme, Hacking and Tockholes) in the issue for April 25th, 1900.]

Bricks and Mortar.

Aphorism for the Week.

Never build after you are five-and-forty; have five years' income in hand before you lay a brick; and always calculate the expense at double the estimate.—KETT.

Our Plates. The study for the treatment of a crescent road, by Mr. Frederick R. Hiorns, shows a colonnade to the buildings on the outer curve of crescent on the principle adopted by Nash for Regent's Quadrant—except that here the colonnade includes two storeys above ground floor. The façade is divided into blocks by two intermediate radial roads bridged across to avoid breaking the main horizontal lines of the elevation and to preserve the continuity of upper terraces. The open central space of crescent is treated as an architectural garden—the monumental column emphasizing the centre of the composition. The drawing is hung in this year's Royal Academy Exhibition.—The Norwich Union Life Insurance Society's head office at Norwich stands on the site of old Surrey House, the residence of the noted Earl of Surrey. The front is built of Clipsham stone. The figures on the pavilions represent, on the one side, Talbot, Bishop of Salisbury, and Chancellor of the Order of the Garter, to whom the first charter for an insurance office (The Amicable) was granted in Queen Anne's reign; and on the other side, Sir Samuel Bignold, the secretary, who virtually raised the Norwich Union Fire and Life Insurance

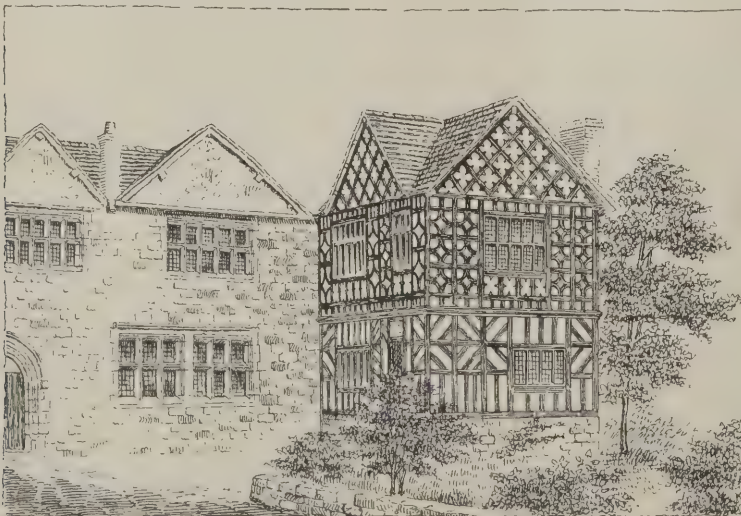
Societies from their infancy. The interior contains a central hall 70ft. square, colonnaded on the ground floor with 40 monolith Cipollino and Verde Antico marble columns, used constructionally, the walls, arches, &c., being also of marble. The first floor is arcaded. The ceiling is partly flat and partly domed, enriched in colour and gold. The staircase is in marble, as are also the corridors upstairs near board- and committee-rooms: these and other rooms are panelled in choice woodwork and enriched with plaster ceilings, &c. The contractor for foundations was Mr. John Hurn, superstructure Mr. George E. Hawes, stonework Mr. E. W. D. Potter, plasterwork Mr. W. G. Crotch—all of Norwich. The marble-work and carving is by Messrs. Farmer & Brindley; the ventilation by Messrs. James Keith & Blackman Co., Ltd.; and the electric lighting by Messrs. Drake & Gorham, Ltd.—all of London. Mr. E. Bilby acts as clerk of works, and the architects are Messrs. George J. Skipper, F.R.I.B.A., and F. W. Skipper, of Norwich. The drawing is hung in this year's Academy.

Birmingham Baths Com-petition.

THE Baths and Parks Committee of the Birmingham Corporation recommend the adoption of Messrs. W. Hale & Son's design for new baths at Balsall Heath, submitted in competition. The estimated cost, including the necessary engineering works, is £30,000. The baths will adjoin the free library in the Moseley Road, and it was specified that the design should harmonize, or at least not clash, with that of the library. Consequently Messrs. Hale's design shows a Renaissance building of red brick, relieved with buff terra-cotta. The suites of private baths are provided on the Moseley Road side, the swimming baths being at the back, with the boiler-house between. The first-class swimming bath will be 150ft. long and 55ft. wide, with a water area of 81ft. by 32ft. There will be sixty-three dressing boxes and a gallery. The second-class swimming bath is to be 85ft. by 48ft. 6in., with a water area of 72ft. by 32ft.; here ninety-five dressing places will be provided, also a soap bath where those bathers who stand in need of such treatment can undergo a preliminary cleansing process. The plans also show a suite of sixteen first-class private baths for men and six for women. The second-class private baths are practically duplicates of the first-class. Over the entrance to the men's department in Moseley Road are two turrets, carried up for the purpose of ventilating the private baths. Nine sets of designs were submitted in the competition, which was restricted to Birmingham architects.

Further Discoveries at Beni Hasan.

THE two years' work which the Beni Hasan Excavations Committee have had in hand is now completed. A whole necropolis of the Middle Empire, representing a phase of Egyptian civilization before B.C. 2000, has been excavated; and a thousand photographs of the interiors of funereal chambers and their contents preserve a record of observations. The interest of the results centres on the discovery within the tombs of numerous models in wood illustrating the domestic, agricultural, industrial or riverine customs of Egypt at the close of the feudal period. Such are groups of persons making bread and beer, the granary with its labourers, overlookers and scribes among the grain. Several fine examples of decorative painting, conspicuous for the freshness and tone of the ancient colours, have been discovered; also a small portrait statue exquisitely carved. The objects will be on exhibition in the rooms of the Society of Antiquaries at Burlington House from July 8th to July 23rd inclusive.



CHORLEY HALL.

STRIKES AND LOCK-OUTS IN 1903.

THE Board of Trade report on the strikes and lock-outs in the United Kingdom last year, and on conciliation and arbitration boards, has just been issued. The year was as a whole comparatively free from industrial stoppages, the total number of building trade disputes having been only 44, affecting 3,663 operatives, as compared with 5,356 affected in 1902, 9,797 in 1901, 19,178 in 1900 and 30,524 in 1899.

More than half of the 44 disputes turned on wages questions, while 84 per cent. of the total working time lost was on account of such disputes. Although 18 of the 25 disputes relating to questions of remuneration had for their object an advance of wages, while in only three were the men resisting a decrease, the aggregate duration of the latter disputes was not very far short of the former. This was due to the protracted dispute in the plastering trade at Bradford. The balance of results in wages disputes was greatly in favour of the employers, since of the total number of operatives engaged in such disputes only 9 per cent. were entirely successful, while 61 per cent. were entirely unsuccessful and 30 per cent. arranged a compromise. On questions other than wages the operatives met with greater success, and taking the disputes as a whole it is found that nearly 27 per cent. succeeded in effecting their purpose, while the employers were successful against 45 per cent. of the total number directly affected. In disputes involving nearly 28 per cent. of the total number directly affected compromises were arranged. These figures show a greater degree of success



HOUSES, KINETON ROAD, OLTON, BIRMINGHAM: GARDEN FRONT.
JAMES A. SWAN, ARCHITECT.

for the employers than those of the preceding year.

There were only six cases in which questions respecting the hours of labour formed the chief cause of a stoppage of work, but it should be remembered that demands on this

point are often put forward as secondary claims at the same time as proposals for alterations of rates of wages, and are therefore not shown separately in the statement of causes or objects.

The two principal disputes in the building trades in 1903 were those of the joiners at Sunderland and the plasterers at Bradford.

On June 18th 350 house joiners in Sunderland came out on strike for an advance in wages from 9½d. to 10d. per hour, of which due notice had been given, the employers giving a counter-notice of a reduction of ½d. per hour. After the dispute had gone on for a few weeks the Northern Counties Federation of Associated Building Trade Employers decided to lock-out the joiners in the different towns affiliated to the association if the dispute should not be terminated before August 30th. Intervention in the meantime by the Mayor of Sunderland resulted in a reference of the dispute to an arbitrator appointed by the Board of Trade (Mr. A. A. Hudson), who awarded that the rate of wages should remain unchanged. This dispute involved a loss of about 27,000 working days.

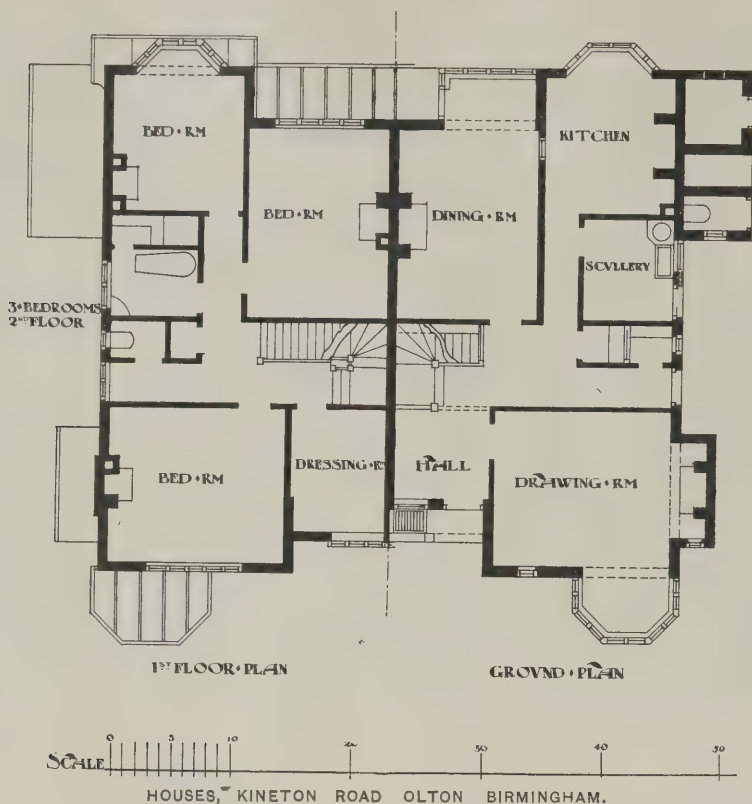
As to the Bradford dispute, on January 1st 190 plasterers came out on strike against a reduction of wages from 9½d. to 8½d. per hour. The men had given a counter-notice for an advance to 10½d. per hour. There were also some other alterations of working rules in dispute. The dispute continued until well into the month of November, when the parties agreed to refer the difference to an arbitrator appointed by the Board of Trade. The Board appointed Mr. A. A. Hudson, who decided that wages should be reduced from 9½d. to 8½d. per hour. The aggregate duration of the dispute was 36,000 working days.

Houses at Olton.—The pair of houses in Kineton Road, Olton, illustrated on this page (Mr. James A. Swan, of Birmingham, architect) provide the following accommodation:—On the ground floor: drawing-room 15ft. by 14ft. and large bay, dining-room 16ft. by 12ft. and large bay, hall 15ft. by 8ft., kitchen 12ft. by 11ft., scullery, larder and pantry (see plan on next page). On the first floor: four bedrooms, bathroom, w.c. and linen-closet. On the second floor: three bedrooms and boxroom. The cost was £1,700.

B 4



HOUSES, KINETON ROAD, OLTON, BIRMINGHAM: MAIN FRONT.



MANCHESTER ROYAL INFIRMARY.

Suggested Modifications of Plans.

THE Building Committee of the Manchester Royal Infirmary suggest certain modifications in the selected plans by Mr. Edwin T. Hall and John Brooke, illustrated in *THE BUILDERS' JOURNAL* for March 30th. The chief modification suggested is the placing of the casualty block adjacent to the Nelson Street entrance, instead of behind the teaching block, with the intention that this entrance shall be the one for all patients. (It is within 1½ miles of St. Ann's Square, between the Oxford Street and Brook Street tramway routes, and on an important thoroughfare leading directly from Oxford Street into the heart of Ardwick.) The Committee have also intimated to the architects that possibly a kitchen for preparing Jewish food and an ambulance stable may be required. These changes leave the plans in accord with the "Instructions to Architects" and do not materially affect the estimated cost. A detailed examination of the plans has satisfied the Committee that no material reduction in cost can be effected except by substantially reducing the number of beds, by lowering the general efficiency of the hospital, or by sacrificing the architectural dignity of the elevations. They propose to have a new block plan prepared embodying such modifications as the Board approve, and after the Medical Board has been consulted and the sanction of the Trustees obtained, to proceed at once with the foundations as a separate contract, whilst the detail drawings are made and quantities taken out for the contract for the superstructure. By adopting this course a saving of at least twelve months in completing the hospital can be effected.

The question of a central "receiving house," which was discussed when the scheme was first proposed, will remain open until the Board is in receipt of the report of the special sub-committee appointed to confer with the Manchester Corporation regarding the ambulance service.

Law Cases.

Quantities and Lump Sum Contracts.

Before the Lord Chief Justice and Mr. Justice Kennedy the case of *Kirk & Randall v. Wyndham* was recently heard. This litigation came before the Court upon a special case stated by Mr. H. T. Steward, the arbitrator to whom an action by the plaintiffs had been referred. The dispute arose out of a contract to build Sir Charles Wyndham's New Theatre at the corner of St. Martin's Court and St. Martin's Lane. It appeared that the plans, drawings and specifications were prepared by Mr. W. G. R. Sprague, the architect, and bills of quantities were taken out by a surveyor. On June 21st, 1901, Messrs. Kirk & Randall tendered for the work, the amount of their tender being £25,814, but Sir Charles Wyndham did not accept it. In August Messrs. George Trollope & Sons, contractors, commenced work upon the site and executed a large quantity of excavation. In October Messrs. Trollope were desirous of discontinuing the work, and Messrs. Kirk & Randall were invited by Mr. Sprague to undertake the completion of it. Negotiations accordingly took place in October and November, and Messrs. Kirk & Randall offered to take over the work and complete the building for a sum of £25,500, but ultimately agreed to reduce their price to £24,800 on condition that no deduction should be made for the work already done by Messrs. Trollope. Sir Charles Wyndham contended the bills of quantities formed part of the contract. If they were not to be part of the contract it would mean a difference of several thousands of pounds. On the other hand it was said that the bills of quantities were not part of the contract for the purpose of affecting the basis of the lump sum agreed upon, but it was admitted that they might be referred to in order to price extras and omissions.—The Lord Chief Justice could not help thinking that the contention really raised on behalf of the defendant before the arbitrator went to the extent that the lump sum could be opened up, and in that way the bills of quantities were to form part of

the contract, not for their proper purpose, but for the purpose of saying that it was not a contract for a lump sum at all. He was clear that this was a lump sum contract, however, and that the documents in question were wholly inadmissible for the purpose of turning the £24,800 into some other figure. But he expressed no opinion as to what was a proper omission or a proper extra—that was a question for the arbitrator—and while he observed that the bills of quantities formed no part of the contract in regard to the lump sum, when the clauses of the contract (which contained the usual provision for extras and commissions) came to be worked out, he said the documents therein referred to were these bills of quantities, and had to be used in the way the contract directed. For the purposes of omissions and extras, therefore, the bills of quantities might be looked at, but not for the purpose of saying that the contract was for measure and value of the work.—The case was remitted to the arbitrator with this direction.

Is a Chimney-pot part of a House?—At the Birmingham County Court His Honour Judge Whitehorne recently delivered judgment in regard to an application under the Workmen's Compensation Act involving two novel points. The applicant was a bricklayer's labourer named Jennings, who fell from a scaffold on March 7th, the respondent being Charles Payne, the building owner of the property. In giving judgment His Honour said two of the conclusions on which his award was based were fairly open to appeal. The first was that a chimney was part of a house and that the chimney-pot was part of the chimney, and therefore to be taken into account in determining the height of the house for the purpose of the Workmen's Compensation Act. He found as facts in this case that the ridge of the roof of the house or houses where the man was at work, and where the accident happened, was less than 30ft. from the ground. So also was the top of the brickwork of the chimney; but the tops of the chimney-pots were more than 30ft. from the ground. He could not treat chimneys as mere accidental appendages to a house, because they were necessary parts of the house, and the pots were integral parts of the chimney. Therefore, he held that the building exceeded 30ft. in height and was being constructed by means of scaffolding. He also found that the three houses, along the side of which the scaffolding ran, formed one building for the purposes of the Act. Secondly, he held that Payne was the building owner, and although several parts of the work were given out to different contractors all the work was carried on under the direct and constant supervision of Payne. His Honour could not accept the respondent's contention that although he supplied the contractors with money when required he left them entirely to themselves and never inspected the work. It seemed to have dawned on him that to escape liability for the accident he had to dissociate himself as far as possible from any personal connection with the actual work. His Honour did not know any case in which a chimney-pot had been treated as part of a house in determining the height of it, nor did he know any case in which the building owner had been held to be the "undertaker" within the meaning of the Act; but in this case he was clear that his decision should be that Jennings was entitled to compensation from Payne. For the present he awarded the applicant 9s. 6d. per week, with costs on B scale.

Whitgift Hospital, Croydon.—At the last meeting of the Croydon Chamber of Commerce an amendment to the proposal to pull down this old building was carried by 20 votes to 5.

MODERN CEMENT WORKS.

ON Wednesday last the Society of Engineers paid a visit to the Portland cement works of Messrs. Martin, Earle & Co., Ltd., at Wickham, Rochester, where they witnessed the manufacture and testing of cement made by the ordinary method and by the new rotary kiln system.

The works, which are now about a mile in length, are situate on the River Medway, and are said to be the largest Portland cement works in Europe. They were acquired by the present company in 1891, when the plant only consisted of a few kilns of the chamber type and a pair of mills for grinding the clinker, power being supplied by a 250-h.p. beam engine. They were enlarged from time to time until in 1899 they had an output of 3,000 tons per week.

About that date, becoming aware of the remarkable results obtained in the United States with rotary cement kilns, the firm investigated the question and erected a full-size experimental kiln on the American system, with which they made a long series of exhaustive experiments. Numerous modifications, alterations and improvements were introduced, until, after about two years of uninterrupted experiment, the firm succeeded in evolving a perfect rotary kiln capable of dealing successfully with the Medway raw materials—chalk and clay—for the manufacture of Portland cement. This kiln was found to offer peculiar facilities for regulating the burning during the process of clinkering, whereas with the intermittent chamber kiln no such correction is possible. The new system also showed itself superior to the old both as regards the quality of the product and the cost of production.

These satisfactory results led to the erection by the company of new works with a battery of sixteen rotary continuous kilns, which give an approximate output of 2,500 tons per week. To carry out this addition the engineering works were enlarged and special machinery was put down for the production of rotary kilns and cement-making plant generally. The first section of the rotary plant has now been running for nearly two years, and the results of its working have amply justified its adoption.

Upon arrival the visitors were received by Mr. Vavasour Earle and other members and officials of the company, by whom they were conducted over the works, following in consecutive order the various stages in the manufacture of Portland cement. The inspection of the rotary process commenced with the chalk and clay, the former being obtained from quarries adjoining the works, whilst the latter is brought in by barges from the company's Medway saltings. These raw materials are formed into slurry with water in washmills, of which there are six. From these the slurry is elevated to the wet-mill house, where it undergoes a double grinding under French burr stones. It passes thence to the mixing vats and then to the storage tanks, in which it is kept in a state of constant agitation, ready for delivery to the rotary kilns.

The Rotary Kiln House

is a large brick building in which the sixteen kilns are arranged in line. The kilns are provided with slurry agitators and coal-firing apparatus. Some are also fitted with apparatus for drying sufficient fuel—which is finely-powdered coal—for the entire battery. The body of each kiln is 90ft. in length, constructed of mild steel and lined with basic firebrick. The kilns are set on the incline and rotate at such a speed as ensures a well-burned clinker. The remarkably large output of 200 tons of clinker per week can be obtained from each kiln, maintaining an average of 25 cwt. per actual

running hour of the kiln. The clinker discharged from the kilns is transferred to horizontal revolving coolers, whence it is taken by conveyors to the crushers, and afterwards elevated to cooling towers.

The dry-mill house is situate behind the cooling towers, and the milling is there done by "Griffin" mills arranged in separate batteries of six mills each, which receive the clinker through chutes from overhead hoppers. The finished cement is conveyed from the dry-mill house by ordinary screw conveyors to the warehouses, where a number of customers have stores specially reserved for their own use. The men employed in connection with the rotary kilns are approximately two-thirds fewer than required to obtain the same output from the old-fashioned kilns.

Three sets of engines are employed to drive the wet plant, the dry-mill and the coal-mill plants respectively, all of which are identical in size and type. Each engine is of the triple expansion marine type, designed for mill-work, with rope drives, and working with surface condensers and centrifugal circulating pumps. High-pressure steam is supplied to the wet plant from a battery of three Lancashire boilers, and to the other plants from a battery of five similar boilers, all fitted with Galloway tubes. The rotary kilns are driven by two horizontal engines with rope drives, and take steam from three marine boilers. The principal buildings on the works, as well as the chalk quarries, are lighted by electricity. Powerful arc lamps are employed, and the current is supplied from a generating station on the works.

A well-appointed laboratory is attached to the works, being equipped with every known scientific device for testing not only the raw materials and the finished cement, but also the exact proportion of mixtures of the raw materials at the various stages of manufacture. It is also fitted up for general research work. The chemist-in-chief and his staff of expert assistants are held responsible for the quality of the finished product, and to this arrangement the company has doubtless to attribute in a marked degree the uniformity of its manufacture and its uninterrupted success. Another factor is the fundamental business principle of the company under no circumstances to deal in cements of the so-called second grade. The leading characteristics claimed for rotary kiln cement are high tensile and growing strain; great crushing resistance; absolute soundness under the boiling-water test; regulation of setting time to almost any limit required; and good colour.

The company justly pride themselves upon the fact that the whole of the engines and machinery for the plant were turned out in their own engineering shops, the control of which devolves upon Mr. A. T. Macfarlane, who designed the engines, machinery and rotary plant.

The Jews' Free School, Bell Lane, Spitalfields—founded in 1817 and now the largest public elementary school in the Kingdom (probably in the whole world)—is to be improved by providing greater space, more suitable sizes for classrooms, more convenience generally, and an additional wing on the southern side. From the architectural standpoint the peculiarity is that two-thirds of the school will be entirely rebuilt without the education being interrupted for a day. The architect is Mr. Robson, the contractor Mr. J. Carmichael, and the clerk of works Mr. Murrell. Red brick will be used with stone-coloured terra-cotta for dressings, salt-glazed bricks for dadoes, and white-glazed bricks very extensively in staircases, latrines and covered playgrounds. Practically the whole building is raised in the air so as to give a maximum of playground space.

Enquiries Answered

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Architects' Liability for Goods Supplied.

OXFORD.—F. S. A. writes: "What is the liability of an architect under an authority given by a builder on him to a merchant for goods supplied, to be paid out of retention money in a contract being executed under the said architect? The builder is two months behind in completing, so that the retention money would be exhausted under agreement."

The architect certainly cannot be held liable. The only authority which he should honour is one from the building owner. The merchant should ask the building owner and the architect to pay on the builder's order, which they can refuse to acknowledge if they choose.

Hand-made Roofing Tiles.

ARCHITECT writes: "Where can I procure old-fashioned hand-made plain roofing tiles so that the cost of carriage to Dundee shall not be very great? They are not, I believe, made anywhere in Scotland."

Apply to Messrs. Baty & Sons, Botcherby, Carlisle; W. Hudspeth, Haltwhistle, Carlisle; J. Jameson & Son, Corbridge, R.S.O., Northumberland; and Claude Londsedale, 25, Lowther Street, Carlisle.

Early Decorated Work at Oxford.

EDINBURGH.—PICT writes: "Is there any early Decorated work in or around Oxford?"

Oxford is not very rich in early Decorated work, but there is some worthy of study. The choir of Stanton St. John's Church, A.D. 1320, is an excellent example of this style, as is also the east window. Merton College possesses some very fine work of this period, the east window, gateway and north door of chapel being worth noticing. Other examples in Oxford are St. Peter's-in-the-East, St. Algate Church and St. Mary Magdalene. The abbey church at Dorchester, 1320, possesses some very fine Decorated work. The doorway, window and nave piers are well worth studying. There is a typical porch at Kidlington, the outer doorway of which is enriched with ball flower; over this is a niche for the patron saint. A very beautiful window is also to be found at Great Milton. St. Martin's Church in Oxford has a very fine tower and spire of this period. The panel and gables of the pinnacle are lined with a profusion of ball-flower ornament. M.

Buildings to Measure around Castleford.

S. writes: "Kindly give me a list of buildings round about Castleford (Yorkshire) suitable to measure for the R.I.B.A. intermediate examination."

There is a very interesting church at Roystone with some good Decorated and Perpendicular work in it. It was built by the monks of the Cluniac Priory at Monk Bretton. The church has also a very peculiar feature, of which only one other example is believed to exist in England, viz., a chamber with an oriel window half-way up the tower on the west side. Methley Church is also interesting, as it contains the Waterton Chapel, in rich Perpendicular style. The roof and screen of the chapel are also excellent. At Lofthouse there is a small ruined Early English chapel built by the monks of Byland Abbey. There is a good Perpendicular gatehouse at the priory at Monk Bretton. M.

Combined Drainage.

LONDON.—SURVEYOR writes: "A is the owner of a house in the Metropolitan area. On one side are two houses owned by B and on the other a house also owned by B. The drain from B's three houses pass into A's property, where A's drain combines with them, and then the drainage of all four houses passes by a single pipe under A's house and thence to the public sewer. A plan had been deposited with the local authority showing the drainage of all four houses. A notice has been served on B to reconstruct the drains of the two houses on one side of A's house, and it is highly probable that a notice will be served on A to reconstruct the drain from his house as far as the point where it enters the sewer, and then B may have a notice about his house on the other side of A's. To what extent, if any, is B liable for that portion of the combined drainage which is on A's property?"

Section 120 of the Public Health (London) Act covers the circumstances in your case. It is not necessary for the authority to serve notices on both the owners. B cannot reconstruct the drainage of his houses without relaying the portion on A's property, and for this he is entitled to recover the proportion of the cost from A. (See *Prevost v. Jolley*, Worship Street Police Court, October 3rd, 1898.) We advise A and B to come to terms; it is to both their interests that the drainage of their respective houses should be in order.

Correspondence.**Liverpool Cathedral Foundations.**

To the Editor of THE BUILDERS' JOURNAL.
LIVERPOOL.

SIR,—My attention has been directed to your attack on my references, in a contemporary, to the foundations upon which the foundation-stone of Liverpool Cathedral is to be placed. The sample sent by me was not of concrete footings but of the stratum of sandstone upon which the concrete footings have been laid. As a practical builder of more than fifty years' experience (part of which consisted of church-work under Pugin) I did not endeavour to "work up public excitement by speculative assumption and ignorance of constructive principles," but from ascertained knowledge, and after consulting the works of Sir Charles Lyell, and other books, and obtaining the opinion of a living geologist of great ability. The history of some of our cathedrals does not encourage the ordinary layman to allow that "experts may be left to deal with everyday matters of constructive science" without so much as a breath of doubt being uttered by "interfering letter-writers to the daily press"; while as regards Truro Cathedral, that fabric having admittedly shown signs of fracture or settlement, I leave it to your readers to decide whether the cause is due to faulty foundations or faulty building construction; but in either case it would not suggest that, in all instances, "an architect would be sure to satisfy himself of this," or even be competent to do so; hence my suggestion that "the cathedral authorities should obtain the highest geological opinion on the foundations before they have proceeded too far with the work."—Yours truly,

THOMAS PRITCHARD.

[It is apparent from the rest of our note that the reference to a sample of "concrete footings" was merely a slip of the pen. The opinion of a geologist on the substrata of the site would be interesting, but architects and engineers alone are entitled to draw conclusions in regard to the design of the foundations. The history of our modern cathedrals certainly does not encourage the expert to trust to the judgment of

laymen. As to the fractures at Truro Cathedral, the report of Sir Thomas Drew did not assign the damage to faulty foundations.—Ed. B. J.]

Keystones.**Wesleyan Church House Competition.**

It is said that more than 250 architects have applied to have their names put on the list of competitors for the new Wesleyan Church House to be erected on the Aquarium site, Westminster.

Abergwili Palace, the residence of the Bishop of St. David's, is to be restored immediately under the direction of Mr. W. D. Caröe, architect to the Ecclesiastical Commissioners. As far as possible its original form will be retained.

The L.C.C. Building Inspector.—"You can scarcely put a hatbox in your backyard in these days without getting the County Council's building inspector upon you," said Judge Edge at Clerkenwell County Court last week.

The Chantry Trust.—The following have been appointed members of the Select Committee of the House of Lords on the Chantry Trust:—The Earl of Carlisle, the Earl of Lytton, the Earl of Crewe, Lord Windsor, Lord Ribblesdale, Lord Newton and Lord Killanin.

The new Municipal Market Hall at Leeds, in Vicar Lane, was opened by Mr. Gerald Balfour on Saturday. It is 245ft. by 102ft., surrounded by eighteen shops and a hotel. Messrs. Leeming & Leeming, of Westminster, were the architects, their design having been selected in open competition. The cost has been £120,000.

The Numbering of Houses.—London houses were first numbered in 1764. The numbering began in New Burlington Street, after which came Lincoln's Inn Fields. In Venice the cumbersome method of numbering the district, instead of the street or square, is still followed. Thus a house in Curzon Street would, if numbered on the Venetian system, be something like "1,000 Mayfair," with "Curzon Street" in brackets.

Sanitary Institute: Forthcoming Congress at Glasgow.—The preliminary programme of the twenty-second Congress of the Sanitary Institute to be held in Glasgow from July 25th to 30th has now been issued. The sectional meetings on engineering and architecture will be presided over by Prof. Henry Robinson, M.I.C.E., and those on physics, chemistry and biology by Prof. Frank Clowes. Of the eight special conferences one will be of municipal representatives, another of engineers and surveyors to county and other sanitary authorities, and another of sanitary inspectors. Among the subjects to be brought forward for discussion will be:—Domestic sanitary engineering in the West of Scotland, the planning and construction of parochial institutions, the construction of hospitals, sanitary fittings, the construction of house drains, purification of trade effluents, sewage-disposal, standards of purity for sewage effluents, the abatement of the smoke nuisance, the municipality and the housing of the poor, the municipality and the plumber, sanitary local authorities and administration of public health, trade diseases and their prevention, the conditions of home work in various trades, ventilation of factories, workshops, schools, &c., certification of houses by sanitary authorities, road maintenance, amendment and consolidation of the Public Health Acts, rural inspection, and the work of women sanitary inspectors. As usual a health exhibition will be held in connection with the Congress.

The Proposed Widening of Piccadilly between St. James's Street and Duke Street is estimated to cost £55,275.

New Premises for Mr. W. Clarkson, the wigmaker, are being erected in Wardour Street, W., from designs by Mr. Horace W. Wakley. The foundation-stone was laid by Madame Sarah Bernhardt on Saturday.

Liverpool Cotton Exchange Competition.

Twenty-four sets of competitive plans were submitted for this building. The design of Messrs. Huon Matear & Frank Simon, architects, Liverpool, has been accepted. Mr. Richard Holt secured second place, with the premium of £250; Messrs. Grayson & Ould the second premium of £150; and Messrs. Gilling & Moorhouse and Mr. H. Hartley shared the third premium of £100. The Exchange will be erected in Old Hall Street and is estimated to cost about £150,000.

New Appointments at King's College.

Mr. Arthur Stratton, A.R.I.B.A., has been appointed lecturer in the architectural division of King's College, London, in succession to Mr. C. H. Reilly, who now occupies the Chair of Architecture at Liverpool University; and Mr. Ronald P. Jones, M.A., has been appointed assistant lecturer with Mr. Stratton. The department was formerly included in the Faculty of Science, but has recently been reorganized and transferred to the Faculty of Arts.

In St. Giles's Cathedral, Edinburgh, a memorial to John Knox is proposed to be erected. The work has been placed in the hands of Mr. Piddendrigh MacGillivray, R.S.A., and is intended to be placed in the Albany aisle. The cost will be about £1,350. There will be a Gothic pedestal and niche 17ft. high, with a figure of the Reformer 6ft. high set in it. The architectural portion of the work is composed of stones of different colours, while the figure is to be of bronze, with a green patina.

Competition for Wear Commissioners' New Offices at Sunderland.—The River Wear Commissioners recently purchased the old Sunderland Post Office in John Street, and offered premiums to architects for plans for two schemes—for an entirely new building and for the conversion of the present buildings into suitable offices. Mr. J. W. Taylor, F.R.I.B.A., of Newcastle (president of the Northern Architectural Association), who was appointed assessor, has awarded the premium for pulling down the old building and the erection of an entirely new one to Messrs. Henderson & Hall, and the premium for the adaptation of the existing premises to Messrs. Robins & Wilson—both of Sunderland.

Views and Reviews.**St. Marie Overie.**

The visitor to St. Saviour's, Southwark, for whom this book is intended need be an ordinary individual interested in the ordinary history of the "finest mediæval building in London after Westminster Abbey": and, as such, he will find much information about the tombs and monuments, and the stories connected with them, which will satisfy his curiosity; but the architectural visitor will not be pleased with the book, for he is not told what he wants to know, though some of the illustrations—more especially one or two drawings by the late H. W. Brewer—will be appreciated. The author has written books of a similar nature before, and he doubtless knows his public, but we cannot recommend the volume to the serious architectural student. As an exhibition of ill-chosen printer's type it is execrable.

"The History and Antiquities of the Collegiate Church of St. Saviour, Southwark," by the Rev. Canon Thompson, M.A., D.D., Rector and Chancellor. London: Ash & Co., Ltd., 42, Southwark Street, S.E., price 5s. nett.

NATHANIEL HAWTHORNE AND ARCHITECTURE.

By F. H. CHEETHAM.

NATHANIEL HAWTHORNE, the centenary of whose birth was celebrated on Monday last, was a great literary artist; and although he disclaimed any knowledge of the technique of sculpture and painting, and was no doubt absolutely sincere in so doing, as a critic of art in all its forms he has a right to a high place. "Very happy," said a reviewer of his romance "Transformation," "is the painter who can find him to look at and to speak about his picture. He has the power of giving you almost more than the impression of the picture itself by the singular charm of his words and the deep sympathy of his thoughts." This, however, could scarcely have been written of him before his sojourn in Europe, and especially in Italy. It was England first, with her mediæval architecture, her National Gallery, and her Manchester Art Treasures Exhibition, that awoke a new sense within him, and it was Italy afterwards with another kind of architecture and more picture galleries that made it possible for the same writer to state of him that "as a critic of art he has a right to the highest place." Hawthorne's English and Italian note-books show very clearly the growth of his enjoyment in, and understanding of, the new world of art in which he found himself. At first everything is strange to him, then he feels his way as it were, comes to a conclusion, revises it, and finally, with inevitable reaction, feels himself on sure ground.

It is in his note-books that Hawthorne is best seen as a critic of architecture. And yet it is hardly fair to call his notes "criticism." They were jotted down at the moment for himself alone, and were meant simply to assist in keeping alive an impression. Hawthorne in his journals is in undress, and, as his son has reminded us, is entertaining, and not asserting, opinions and ideas. The New England novels and stories may be almost left out of account in an enquiry concerning Nathaniel Hawthorne and architecture. They were all written before Hawthorne had seen any real architecture at all. And the romance "Transformation," written with the fullness of a residence in Rome, is concerned more with painting and sculpture than with architecture. The note-books, however, are full of passages of great interest describing Hawthorne's impressions of well-known buildings both in England and Italy. The value of his criticism is that the writer comes to his subject with a perfectly fresh mind and, above all, with a mind full of a pure love of the beautiful, and with a controlling sense of artistry in his nature. This supreme sense of artistry is manifest in the literary craftsmanship of his American tales, but till his visit to Europe it had never been brought face to face with the creations of the painter, the sculptor and the architect. "The House of the Seven Gables," it is true, presents us with a strong picture of a New England dwelling—a seventeenth-century timber-framed house—but the colours, though strong, are not distinct. The house, although it gives its name to the book, is not its central figure, as the cathedral of Paris is in Victor Hugo's great novel. It is but the setting of the story, and the impression left of it is rather a vague one. Though Hawthorne gives many details concerning the building, you cannot reconstruct it from his pages. This was no doubt because, to use his own words, "I never had any particular house in my mind when I wrote the story. It was just a fancy of my own."

But it is in "The House of the Seven Gables" that he puts into the mouth of one of his characters these curious words: "We shall live to see the day, I trust, when no

man shall build his house for posterity. Why should he? He might just as reasonably order a durable suit of clothes—leather, or gutta-percha, or whatever else lasts longest—so that his great-grand-children should have the benefit of them and cut precisely the same figure in the world that he himself does. If each generation were allowed and expected to build its own houses, that single change, comparatively unimportant in itself, would imply almost every reform which society is now suffering for. I doubt whether even our public edifices—our capitols, state-houses, city halls and churches—ought to be built of such permanent materials as stone or brick. It were better that they should crumble to ruin once in twenty years, or thereabouts, as a hint to the people to examine into and reform the institutions which they symbolize." This idea, of how we are crushed down by the deadweight of the past, is a constantly recurring one with Hawthorne, and finds expression over and over again in his journals. The British Museum is a nightmare to him on this account, but in other moods he sees a more cheerful side to the picture and even rejoices over such links with the past as our Gothic cathedrals afford.

It may be said at once that Nathaniel Hawthorne was a Goth. He appreciated and admired the architecture of Italy, but it did not win him from his allegiance to the work of the mediæval builders which had so taken hold of him on first seeing it in England. He viewed architecture not as an architect, but as a lover of the beautiful to whom the basis of beauty must rest in morality and truth. Though he formulates no theories, and though his admiration of Gothic does not shut his judgment against the merits of many Classic and Italian buildings, he is nevertheless visibly near the standpoint of Ruskin as a critic of architecture, though he probably was sublimely unconscious of it. "I always see great beauty and lightness in Classic and Grecian edifices," he says, "though they seem cold and intellectual and not to have had their mortar moistened with human life-blood, nor to have the mystery of human life in them as Gothic structures do." And again: "I admire this in Gothic architecture—that you cannot master it all at once, that it is not a naked outline, but as deep and rich as human nature itself, always revealing new ideas. It is as if the builder had built himself and his age up into it, and as if the edifice had life. Grecian temples are less interesting to me, being so cold and crystalline."

We must not literally take it as Hawthorne's own thought that each generation should build its own houses, but one of his preferences for Gothic architecture lies, perhaps, in the fact that he found the mediæval ruins of England apparently far older and more decaying than the Classic ruins of Italy. "The Italian climate," he says in "Transformation," "robs age of its reverence and makes it look newer than it is. Not the Coliseum, nor the tombs of the Appian Way, nor the oldest pillar in the Forum, nor any other Roman ruin, be it as dilapidated as it may, ever give the impress of venerable antiquity which we gather, along with the ivy, from the gray walls of an English abbey and castle. And yet every brick or stone which we pick up among the former had fallen ages before the foundation of the latter was begun. This is owing to the kindness with which Nature takes an English ruin to her heart. She strives to make it part of herself, gradually obliterating the handiwork of man, and supplanting it with her own mosses and trailing verdure, till she has won the whole structure back. But in Italy, whenever man has once hewn a stone, Nature forthwith

relinquishes her right to it, and never lays her finger on it again. Age after age finds it bare and naked, in the barren sunshine, and leaves it so."

That it was not altogether a matter of climate that Hawthorne had in his mind we may deduce from an entry in his journal about this time, in which he says: "Everything of Gothic origin has a faculty of conveying the idea of age; whereas Classic forms seem to have nothing to do with time, and so lose the kind of impressiveness that arises from suggestions of decay and the past." This marks a great change from the speaker in the Seven Gables. And a little later, still in full sympathy with the past, he says: "Roman ruins do not impress me with their antiquity. They belong to quite another system of society and epoch of time, and in view of them we forget all that has intervened betwixt them and us, so that we look across a gulf to the Roman ages, and do not realize how wide the gulf is."

After some months of residence in Italy, with much time given to pictures and sculpture and architecture, he writes: "I am partly sensible that some unwritten rules of taste are making their way into my mind; that all this Greek beauty has done something towards refining me, though I am still, however, a very sturdy Goth." And later he writes: "There is something, I do not know what, but it is in the region of the heart rather than in the intellect, that Italian architecture, of whatever age or style, never seems to reach."

Two of Hawthorne's criticisms of Italian buildings of different age and style may be given here. The first is of Giotto's campanile at Florence. "It is like a toy of ivory," he says, "which some ingenious and pious monk might have spent his lifetime in adorning with scriptural designs and figures of saints; and when it was finished, seeing it so beautiful, he prayed that it might be miraculously magnified from the size of one foot to that of three hundred. This idea somewhat satisfies me, as conveying an impression how gigantesque the campanile is in the mass and height, and how minute and varied in its detail. . . . In the gem room of the Uffizi you may see fifty designs elaborated on a small scale, that have just as much merit as the design of the campanile. If it were only sin. long it might be a case for some article of the toilet; being 200ft. high its prettiness develops into grandeur as well as beauty."

St. Peter's he declares to be very ineffective, "like all the other architectural works of Michel Angelo." "He has made of it as little as could possibly be made of such a vast pile of material. He balances everything in such a way that it seems but half of itself. . . . It is woeful to think how the vast capaciousness within St. Peter's is thrown away, and made to seem smaller than it is by every possible device as if on purpose."

So he leaves Italy still a Goth, and arriving at Lyons visits the cathedral. "It did me good to enjoy the awfulness and sanctity of Gothic architecture again," he records, "after so long shivering in Classic porticoes." He acknowledges that the charm is moral rather than intellectual: "I could not but feel that there is a moral charm in this faithful minuteness of Gothic architecture filling up its outline with a million of beauties that perhaps may never be studied out by a single spectator. . . . Classic architecture is nothing but an outline and affords no little points, no interstices where human feelings may cling and overgrow it like ivy."

"A majesty and a minuteness, neither interfering with the other, each assisting the other, this is what I love in Gothic architecture." And again, in a phrase which is an aphorism: "It is the test of Gothic sublimity to overpower the ridiculous without designing to hide it."

Although during the time he was in England, Hawthorne lived mostly in Liverpool and its neighbourhood, he was in the habit of taking long excursions, and by this means saw a great deal of the country. He has put on record his impressions of some dozen English cathedrals, including Lincoln, Lichfield, York and Salisbury. These four seem to have impressed him the most. But he is always conscious of his want of real understanding of architecture (he speaks of "the audacity of my ignorance"), is in despair at his attempts to describe what he has seen, and feels that "it is wicked to look at these solemn old churches in a hurry." Nevertheless his impressions are full of a very real interest, and his criticisms show acumen and knowledge, even if it is not real understanding.

At his first sight of York Minster he is not greatly impressed "because it is rectangular in its general outline and in its towers, and seems to lack the complexity and mysterious plan which perplexes and wonder-strikes me in most cathedrals." But a year later he unreservedly gives his allegiance to York: "York Cathedral is the most wonderful work that ever came from the hands of man. Indeed, it seems like 'a house not made with hands' but rather to have come down from above, bringing an awful majesty and sweetness with it; and it is so light and aspiring, with all its vast columns and pointed arches, that one would hardly wonder if it should ascend back to heaven again by its mere spirituality."

He compares Lincoln with York. "Its (Lincoln's) exterior is certainly far more beautiful than that of York Minster; and its finer effect is due, I think, to the many peaks in which the structure ascends, and to the pinnacles which, as it were, repeat and re-echo them into the sky. York Cathedral is comparatively square and angular in its general effect: but in this at Lincoln there is a continual mystery of variety, so that at every glance you are aware of a change and a disclosure of something new, yet working an harmonious development of what you have heretofore seen."

Lincoln, indeed, "took possession" of him, and would not let him be at rest. The west front was miraculously grand and full of spiritual beauty. "It does not impress the beholder as an inanimate object, but as something that has a vast, quiet, long-enduring life of its own—a creation which man did not build, though in some way or other it is connected with him and kindred to human nature." Then, conscious that this is not criticism, he exclaims: "In short, I fall straightway to talking nonsense when I try to express my inner sense of this and other cathedrals."

His general impression of English cathedrals he sums up in these words: "Cathedrals are almost the only things (if even those) that have quite filled out my ideal here in this old world; and cathedrals often make me miserable from my inadequacy to take them wholly in; and above all, I despise myself when I sit down to describe them."

At Coventry he tumbles upon the restorer, and has a word to say about his work. "We went into three churches, and found that they had all been subjected to the same process. It would be nonsense to regret it, because the very existence of these old edifices is involved in their being renewed; but it certainly does deprive them of a great part of their charm, and puts one in mind of wigs, padding, and all such devices for giving decrepitude the aspect of youth."

On the whole, after seeing the churches of Italy, I was not greatly impressed with these attempts to renew the ancient beauty of old English minsters; for it would be better to preserve as sedulously as possible their aspect of decay, in which consists the principal charm."

A modern church closely imitating the mediæval architecture and arrangements draws from him this criticism: "I think the time must soon come when this sort of thing will be held in utmost scorn, until the lapse of time shall give it a claim to respect. But, methinks, we had better strike out any kind of architecture so it be our own, however wretched, than thus tread back upon the past." It was because he was such a sturdy Goth that Nathaniel Hawthorne took no pleasure in the Gothic Revival.

In something of the same vein he writes of modern half-timber houses: "Such houses, like all imitations of bygone styles, have an air of affectation; they do not seem to be built in earnest—they are no better than playthings, or over-grown baby-houses, in which nobody should be expected to encounter the serious realities of either birth or death. Besides, originating nothing, we leave no fashions for another age to copy when we ourselves shall have grown antique."

Hawthorne's criticisms on two modern buildings must bring these extracts from his note-books to a close. He was at first delighted with the new Houses of Parliament, then nearing completion. "It is an immense structure, and certainly most splendid," he exclaims . . . "But by-and-by I began to be sensible of a weariness in the effect, a lack of variety in the plan and ornament, a deficiency of invention; so that, instead of being more and more interested the longer one looks, as is the case with an old Gothic edifice, and continuously reading deeper into it, one finds that one has seen all in seeing a little . . . I doubt whether it is so impressive as it might and ought to have been made, considering its immensity. It makes no more impression than you can well account to yourself for, and you rather wonder that it does not make more. The reason must be that the architect has not 'built better than he knew.' He felt no power higher and wiser than himself making him its instrument. He reckoned upon and contrived all his effects with malice aforethought and therefore missed the crowning glory."

The Carlton Club was then but newly erected, and Hawthorne was much struck with its beauty, but his praises take this shape: "This delicacy and minuteness of finish, this lavish ornament, made me think of a lady's jewel-box; and if it could be reduced to the size of about a foot square or less, it would make the very prettiest one that ever was seen."

It may be said of Hawthorne, as of Ruskin, that his attitude to architecture was that of the moralist. He approached it from the æsthetic and philosophical side, not from the historical or professional. He, however, never posed as a teacher, or even as a critic, in matters of art, and it may therefore be urged that to speak of his "attitude" to architecture is an exaggeration. Into all Hawthorne's appreciation and criticism the heart entered as well as the intellect. But the heart never entirely took the place of the intellect; it only corrected its judgment. "It seems to me," wrote Hawthorne, "that a work of art is entitled to credit for all that it makes us feel in our best moments, and we must judge of its merits by the impression it then makes, and not by the coldness and insensibility of our less genial moods." Between St. Paul's and Westminster Abbey there was to him "in their relations to the human heart" as much difference as between a snow-bank and a chimney corner.

The new Victoria Pavilion at Ramsgate has been erected by the Corporation at a cost of about £40,000 from designs by Mr. Stanley D. Adshead, of London. Mr. G. Munter, of Westminster and Putney, was the contractor. The great hall provides seating accommodation for about 2,000 people.

Builders' Notes.

Messrs. E. H. Shorland & Brother, of Manchester, have just supplied their patent Manchester grates to the county school, Bangor, North Wales.

Tenders for the Superstructure of the Long Grove Asylum, on the Horton estate at Epsom, are about to be invited from selected firms. The estimated cost of the asylum is £570,000.

Messrs. Colledge & Bridgen, of Wolverhampton, have supplied all the locks and builders' ironmongery, including the fanlight gearing, for the new sanatorium at Frimley (Mr. E. T. Hall, F.R.I.B.A., architect).

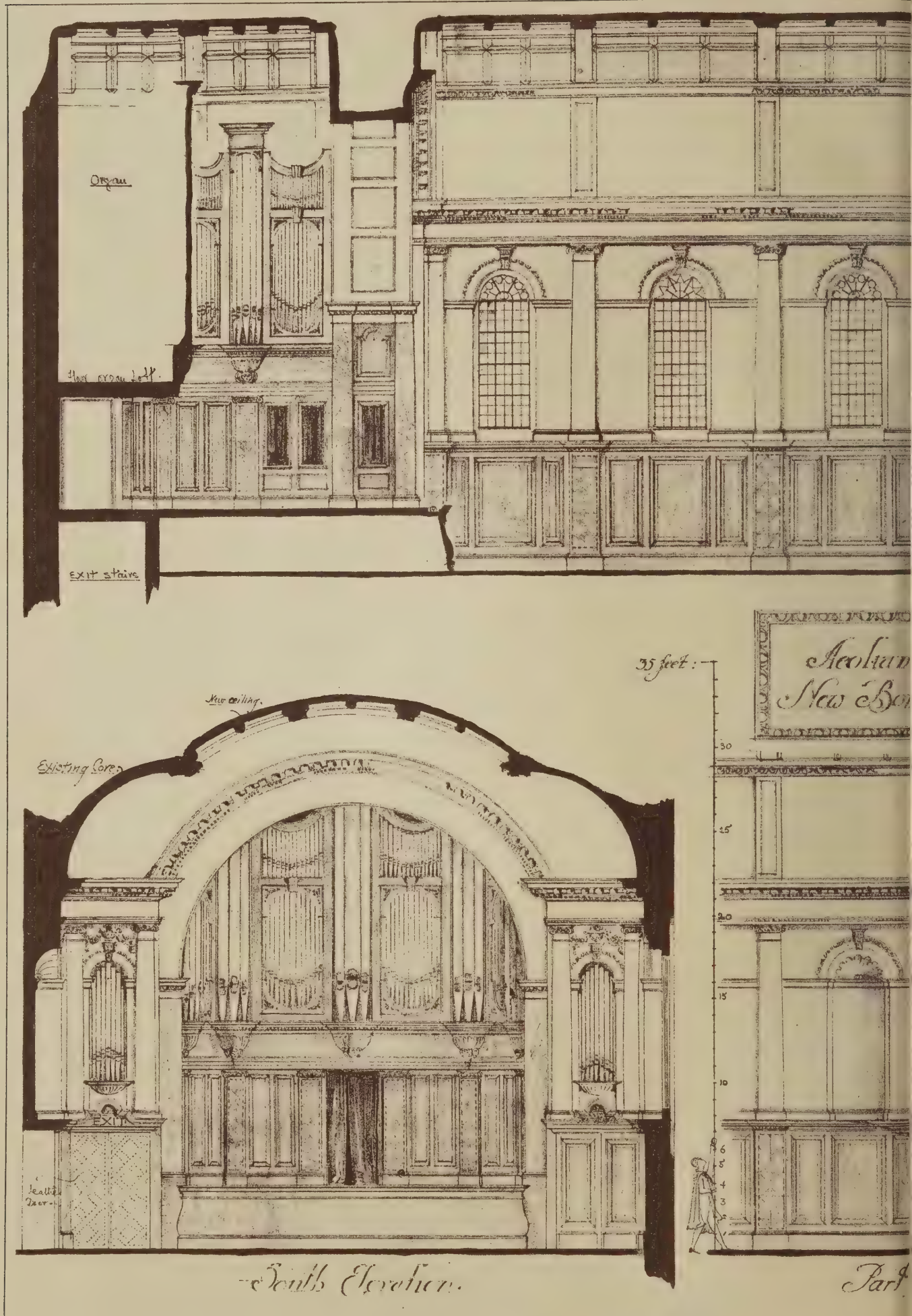
Savoy Hotel Extensions.—Messrs. J. A. King & Co. request us to state that the external plastered angles of "Mack" slab partitions fixed in these buildings are protected with the British steel corner-plate. This is of galvanized steel keyed to take the plastering and forms a very strong angle. It has been adopted for numerous buildings, notably in Fleming's restaurant, Oxford Street, W., and at Sir Samuel Scott's residence, Westbury Manor, in Northamptonshire. The makers are the British Steel Corner-Plate Co., 101, Queen Victoria Street, London, E.C.

An International Industrial Exhibition at Cape Town is to be held for three months, from November next to February, with the primary object of serving as a market and affording an invaluable means for extending trade. Full particulars can be obtained from the offices of The Trades Markets and Exhibitions, Ltd., Palmerston House, Old Broad Street, E.C. The buildings have been designed by Mr. H. S. East, A.R.I.B.A., of London.

Municipal Stone-Making.—Since the West Ham Corporation set up business as manufacturers of paving-stones from clinker and cement eight or nine years ago the total output has been 2,671,662ft. super., produced at a cost which shows a credit of £19,221 as compared with the cheapest paving-stone on the market. There are, however, critics who consider that the nett saving to the rates is much less than represented seeing that there has been a much too lavish use of the artificial paving-stones in the borough.

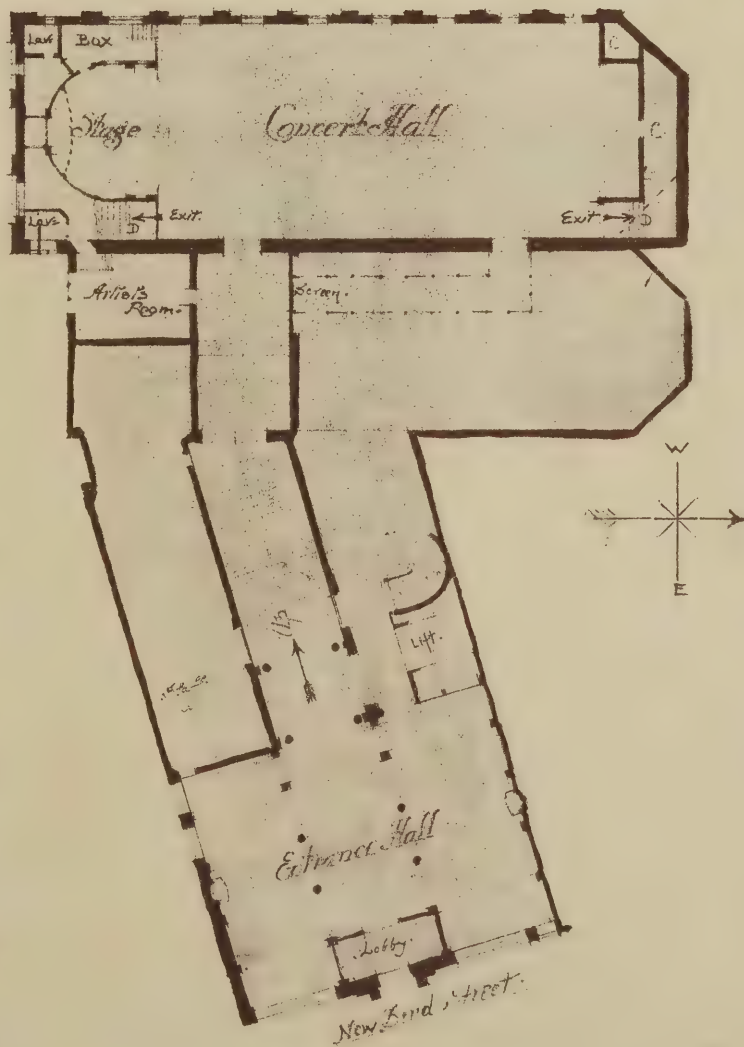
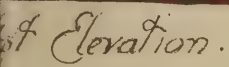
The Darlington Hotel Disaster, New York.—The grand jury indicted the owner of this hotel (which collapsed in March last, causing a loss of about twenty lives) and recommended that the inspector whose duty it was to examine the condition of the steel-work of the building should be immediately dismissed, as he was "grossly negligent and entirely unfit for his position." It now appears that not only have the police failed to arrest the owner of the hotel, but the inspector who was censured still retains his post and is still examining buildings for the city.

Strand Improvement: Sites in Aldwych to be Offered again.—Three sites in Aldwych (the crescent to the new Strand-Holborn thoroughfare) are to be put up to auction on Monday, July 18th. One has a commanding corner position opposite St. Clement Danes Church, its superficial area being 22,420ft. This was put up to auction last year, but remained unsold. The lease will be for eighty years from December 25th next. It is stipulated that the elevations are to be of marble, granite, Portland or other approved stone or brick, and of such design as the County Council shall think worthy of the position; also, the purchaser of the land will have to spend not less than £100,000 on the buildings. The second lot to be sold is on the north side of Aldwych and covers a superficial area of 9,000ft. Not less than £18,000 must be spent on the buildings to be erected on it. The third lot is also on the north side of Aldwych and has a superficial area of about 10,180ft. On the buildings to be erected upon it not less than £20,000 is required to be spent.



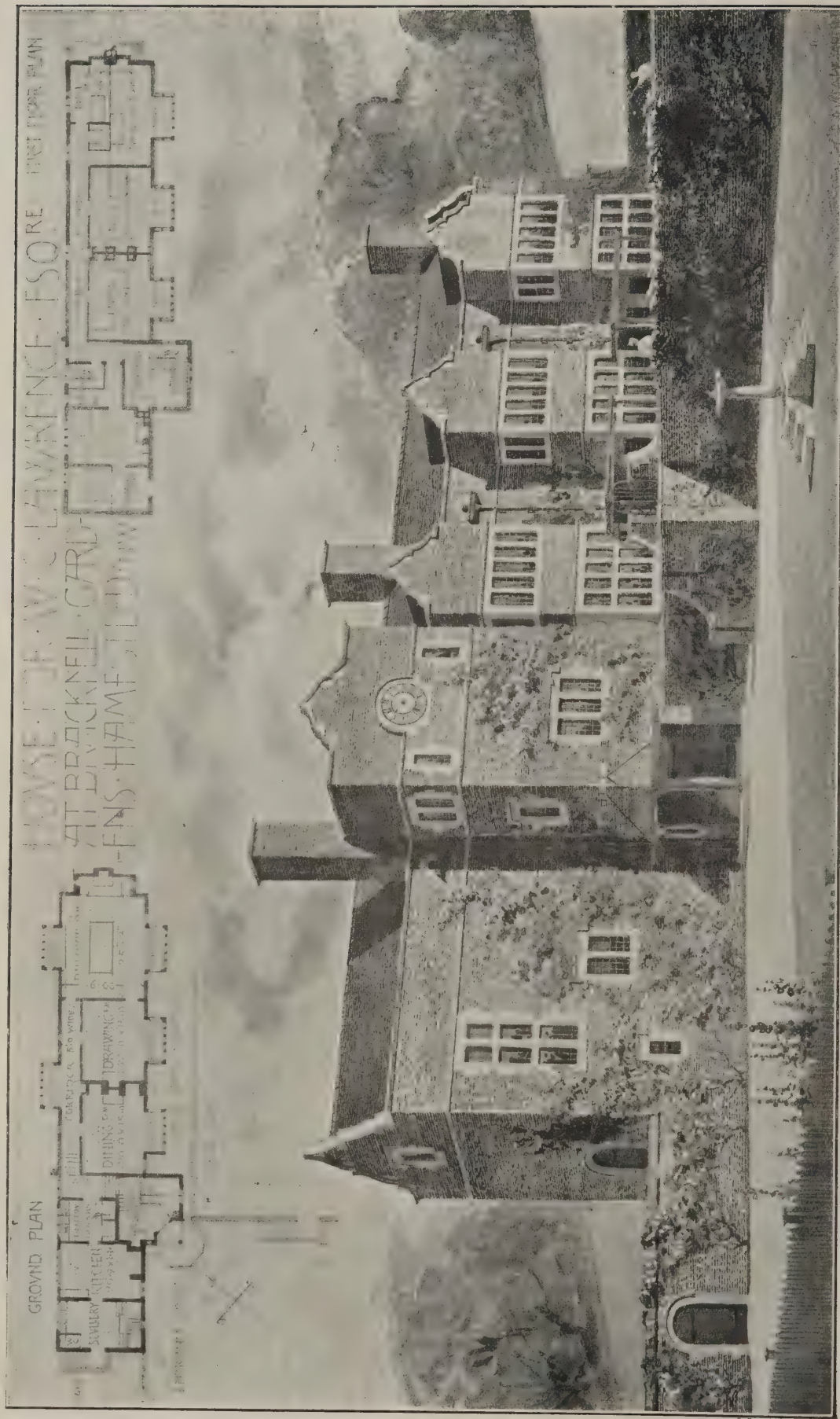


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C. F. A. VOYSEY, ARCHITECT. (ROYAL ACADEMY EXHIBITION, 1904.)



"PORTLEY WOOD," WHYTELEAF, SURREY. WALTER E. HEWITT, A.R.I.B.A., ARCHITECT.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

July 13, 1904. Vol. 20, No. 492.

6, Great New Street, Fetter Lane, E.C.

Summary.

A semi-official report on the great Baltimore fire by Professor Norton testifies to the excellent fire-resisting qualities of brickwork and ferro-concrete construction, while terracotta partitions and floors are described as having proved unfit—the loss of terracotta beam and post coverings was at least 75 per cent. Stone, marble, slate and plaster were completely wrecked. The steel frames were not injured by more than 10 per cent., and the cast-iron stair-frames and rails stood remarkably well in most instances. (Page 15.)

For bricklayer's work, the prime-cost of stock bricks delivered on a London site averaged about 20s. per thousand in 1776, 42s. in 1811, and at the present time may be taken at 40s. per thousand. The labour rates for bricklayers have gradually increased from approximately 3d. per hour in 1776 to 10½d. per hour at the present time; whilst the cost of ordinary stock brickwork in mortar has varied from £8 per rod in 1776 to £17 per rod in 1904. In 1822 the tenant of a dwelling-house containing six windows was charged 6s. 6d. per annum, ten windows £2 16s., twenty £11 4s. 6d., fifty £34 10s., and £58 17s. for one hundred windows. (Page 20.)

In a memorandum on building accidents, just issued, the Chief Inspector of Factories recommends that every working platform more than 8ft. above the ground should be provided with a guard rail and boards on edge, that all "runs" should be at least 18in. wide, that scaffold boards forming part of a working platform should be supported at each end by a putlog and not project more than 6in. beyond it, and that ladders should rise some feet above the place they give access to. (Page 18.)

According to a decision made by the Court in New Jersey it seems that a builder who has safely executed his own design may secure a licence as an "architect." (Page 23.)

The improvement scheme threatening the Whitgift Hospital at Croydon has been shelved, and it is probable the old building will now be left untouched for some years. (Page 24.)

The dispute between the operative stonemasons and the master-builders of Sheffield has been settled. It is now agreed that no worked or partly-worked stone shall be introduced into the town, beyond stone planed up to the square and chamfered coping, except flags, steps and landings. (Page xiii.)

The mansion known as Bagatelle in the Bois de Boulogne, Paris, is proposed to be purchased by the Municipal Council for £260,000. It is said to have been the outcome of a wager that it could not be built in three months, though it was actually finished in fifty-eight days. (Page 23.)

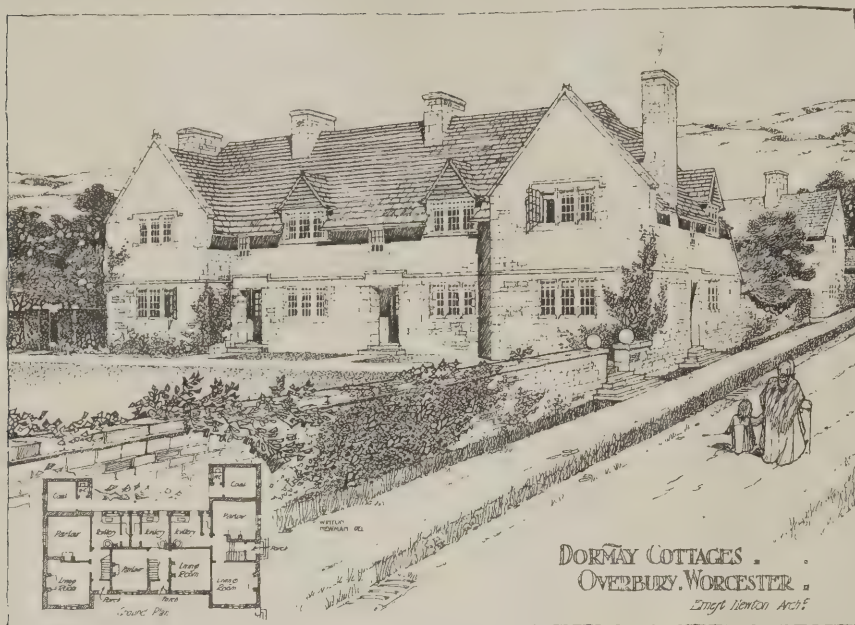
The Soane Curatorship.

THE curatorship of Sir John Soane's Museum, rendered vacant by the death of Mr. G. H. Birch on May 10th, is about to be filled up, the terms of the Act of Parliament requiring the curator to be appointed within three months of a vacancy occurring. The salary of the curator is £300 a year and a residence at the Museum. The curator must be an English architect not less than twenty-five years of age who has distinguished himself by his works or by the attainment of some academical prize, preference being given to a candidate who is prepared to relinquish private practice. The election of the curator is in the hands of the president and council of the Royal Academy, the trustees (of whom there are five) having no voice in the matter. Among the candidates the names are mentioned of Mr. Walter L. Spiers, the acting curator, Mr. Alfred Aitchison, Mr. Bernard Whelan, Mr. E. S. Prior, Mr. Middleton, Mr. Hugh Stannus and Mr. John Hebb. The claims of Mr. Walter Spiers for the appointment would appear to be paramount, he having acted as temporary curator for Mr. Birch during the latter's four months' leave of absence abroad, on account of his health, in the spring of this year. It is not, however, certain that the choice of the president and council of the Academy will fall upon an architect as directed by the Act of Parliament, this direction having been disregarded by the election of Mr. Joseph Bonomi to the curatorship, he being a sculptor and Egyptologist; and of Mr. Wyatt Papworth, who was more a literary man than an architect.

Padua.

In the age of big things it is curious to remember how much of the beauty of the world is contained in small cities. Oxford is small; Genoa and Venice, judged by modern standards, are of moderate extent; the historic cities of Flanders cover a very limited area. To the architectural student, as well as to any visitor who cares for history, this crowding together of valuable things, this concentration of interest, is exceedingly attractive. The older towns of Europe were closely packed within a circle of fortified wall, and long remained so. Their chief buildings often stand shoulder to shoulder; they form groups, and even when built at different periods are carefully harmonized. Among the smallest of celebrated places is Padua. It lies twenty miles inland from Venice and is crowded with architectural monuments. Seen from the train it presents an extraordinary mass of towers and cupolas rising over the great alluvial plain of the Bacchiglione. These campanile towers belong not only to churches but are relics of a time when any

private family of importance was nearly certain to possess one—partly for shelter in times of tumult, partly as a mark of distinction. Picturesque effect is the prevailing note everywhere, but what strikes the Northern traveller most is the fact that this is obtained throughout the greater part of the town without the aid of Gothic and with so little in the way of gables and pinnacles. Colour is supplied sometimes by sun-blinds, sometimes by painted shutters. Merely to walk through the streets is an education. Most of them are arcaded and built over the pavements, and when this feature is absent the balcony, bold and obviously built for genuine and daily use, breaks up the house fronts. "Municipalism" is a modern thing to us; it is centuries old in Italy. All the buildings are surprisingly vast. The great palace which constitutes the town hall dates from the twelfth century. Its giant "Salone" is larger even than Westminster Hall: 312ft. in length, 108ft. in breadth and 108ft. in height. The roof, curiously painted with representations of the Seasons and their appropriate industries, rises "like a boat upside down"; at one end stands one of the most singular objects in the world, a model of the Trojan Horse—a model itself of considerable size, and recalling the tradition that the city was founded by fugitives from Troy. Churches abound, the most remarkable being that dedicated to St. Anthony of Padua, popularly known as "the Santo." Here on a central structure of Italian Gothic—that curious mediæval work which we begin by disliking and end by praising—are found no fewer than seven Oriental cupolas, and internally, almost every variety of decorative detail of which religious art is capable. There are four great organs, each mounted high in its own gallery, and used together in the services. There is an exquisite Renaissance chapel by Sansovino—who built the luckless porch of the tower of St. Mark at Venice; its screen of light round arches in white marble dividing it from the choir, and continued as a blind arcade around the walls, is of extraordinary grace and delicacy. At the eastern extremity of the building a small circular structure contains the famous Treasury, rich with the offerings of centuries in reliquaries, monstres and ecclesiastical objects of many kinds. At sunset, when the light streams in from a circular window opening into the church and falls upon the great golden cupboard—raised on a marble *perron*—there are few sights more wonderful in Italy. And wonder grows greater when an attendant throws back the elaborate golden doors and the light flashes among its dazzling contents.



("Modern Cottage Architecture.")

THE ENGLISH HOUSE.

A NUMBER of books dealing with town and country houses in this country have been published during recent years. We have now to draw attention to three more which have just been issued, two of them by English publishers and one by a German; and, in brief, we must say that the last is undoubtedly the best.

We may first turn to a book of illustrations issued at 5s. by Messrs. Hodder & Stoughton.* Here we have gathered together a variety of work, though country houses of an expensive character go to make up the bulk of the illustrations, some of which are in colour. Most of the well-known "domestic men" are represented—Mr. Norman Shaw, Mr. Lorimer, Mr. Lutyens, Mr. Dawber, Mr. Voysey, Mr. Newton, Mr. Belcher, Mr. Walton, Mr. Bidlake, &c., &c.—and some of them have been induced as well to write the short articles that preface the sections of the book; thus Mr. Arnold Mitchell writes about "Plans for the Home," Mr. Dawber "The Home from Outside," Mr. Shaw "The Home and its Dwelling Rooms" (wherein he says that pattern on a wallpaper is a mere trifle compared with tone, and expresses his preference for the French treatment of the cornice as the top of the wall, instead of part of the ceiling); while Mr. Orrock talks about colour in decoration—banning emerald green, brick-red and terra-cotta, as being disturbing elements; Mr. Brangwyn and Mr. Harold Cooper deal with "The Home and its Bedrooms"; Mr. Macartney treats of "The Home and its Halls"—the best article in the book; Mr. Spooner on furniture; leaving Mr. John Cash with the last section on "The Home and its Decorative Essentials." But of course it is the illustrations that make the book interesting. We give three of them as showing their quality. The scheme of the book, however, is not a very orderly one, for the splitting up of "the home" results in different architects' work being repeated in different sections, which creates a feeling of haphazardness. Still we have no doubt the collection will appeal to many architects and others, especially as the illustrations are mostly from photographs, and are so numerous.

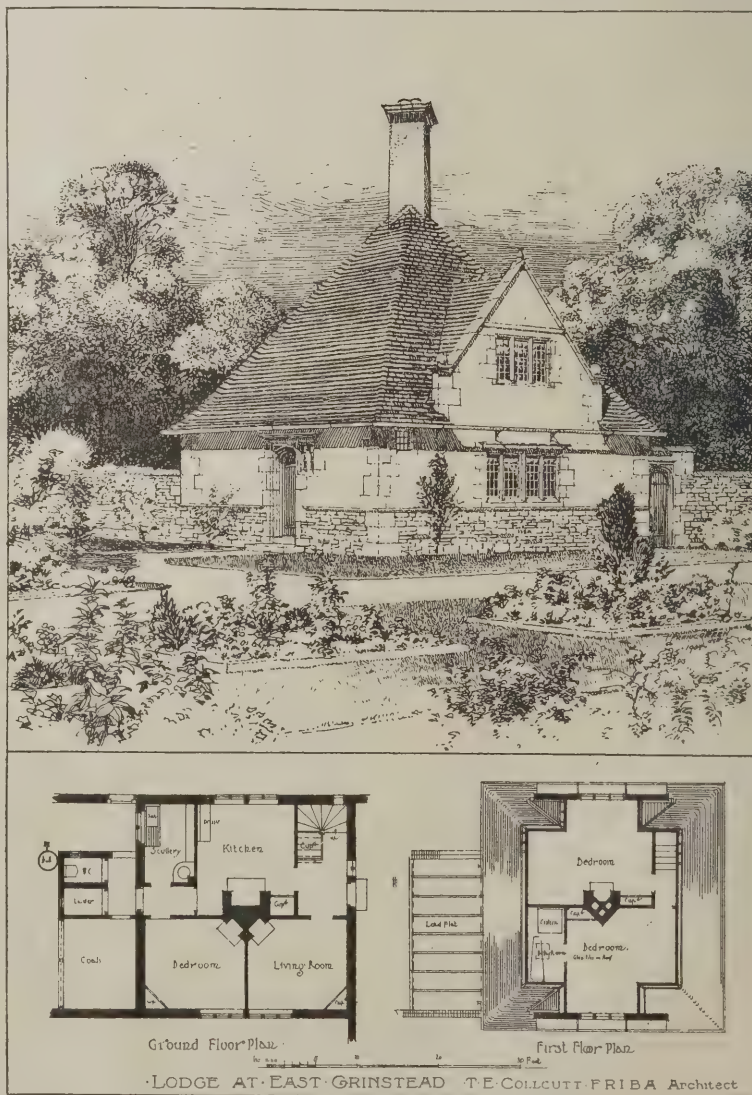
The second book to be noticed is Mr.

Adams's,* wherein fifty perspectives of cottages by various well-known architects are given as plates. Many of the perspectives are good examples of draughtsmanship, but no one

* "Modern Cottage Architecture," edited by Maurice B. Adams. London: B. T. Batsford, 94, High Holborn, price ros. 6d. nett.

will regard them as anything like so satisfactory as photographs of the houses would have been; and in comparison with Messrs. Hodder & Stoughton's book it is rather more like half the value than double; nor can the entire omission of interior views be commended, considering that the interior treatment of these small buildings is, if anything, more important than the outside.

The introductory notes by Mr. Adams are poor and uninteresting. There is no discerning discussion of planning, sites and cost (in this respect the book would have been valuable if the cost of each house illustrated had been given). It is all very chatty and agreeable, but not serious enough for a book of this size and price. In short it is a fashion book, and the architect who has to design small houses will not find it of much use for "cribbing" purposes, nor will the builder or estate owner be able to make direct use of the perspectives and small plans (sometimes not all the floors being given). That difficult problem, the design of houses of very narrow frontage, the treatment of which by clever architects would have been really suggestive and useful, is not dealt with, for the examples of model cottages at villages like Port Sunlight and Bournville do not apply, because land is so much cheaper there. As regards the planning of these cottages, gate lodges, &c., it is of course a great improvement on the usual type, but the most is seldom made out of the money available, the main attention being given to the exterior. The compass point is rarely shown, nor indeed is a clue given, so that Mr. Adams rather weakens his advocacy of architects on the



("Modern Cottage Architecture.")

* "The British Home of To-Day," edited by W. Shaw Sparrow. London: Hodder & Stoughton, 27, Paternoster Row, price 5s. nett.

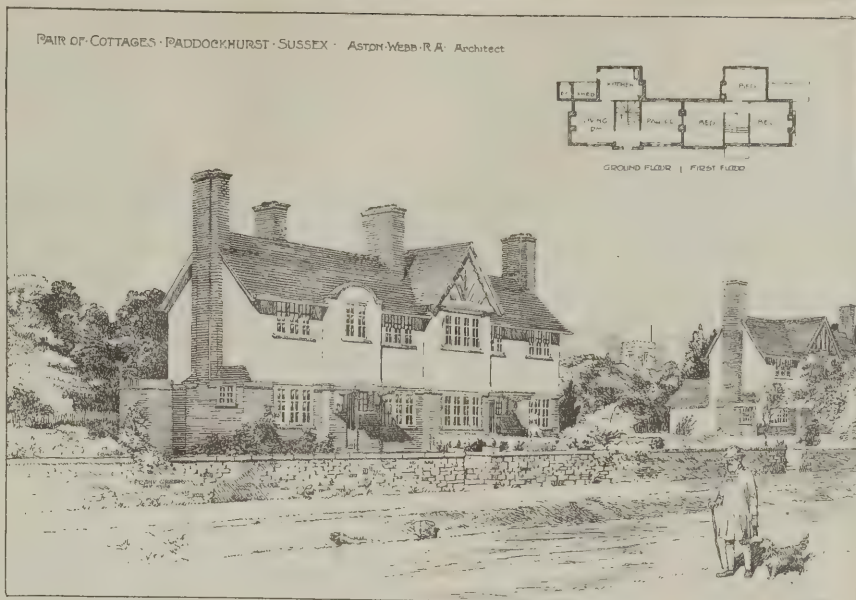
ground of their studying aspect, whereas the speculative builder does not often trouble himself about this important point.

Many of the plates have already been published in our journal, but we reproduce three as showing the class of illustration. Of these, we may give the following particulars:—The cottages at Overbury by Mr. Newton are built of local rubble stone, squared more or less, and built with thickish mortar joints brushed off; there is no pointing; the roofs are of stone slates, dormers of oak. The cottages stand at the end of the village street, which slopes gently up a hill. The cottages at Paddockhurst, Sussex, by Mr. Webb, are built of red bricks and rough-cast, with tiled roof, and form part of a series of buildings erected in this picturesque village. The lodge at East Grinstead by Mr. Colclutt is erected of local stone with stone slates for the roof.

Turning now to the German book on English houses* the contrast is somewhat humiliating, for the book is done exceedingly well. Foreign critics have all praised English domestic architecture as the best in the world, and Herr Muthesius, in his preface, draws the attention of his German readers to the essential qualities of the English home, wherein all our affections are centred.

There are to be three volumes of this work, dealing respectively with (1) the development of the English house; (2) site, foundations and erection; (3) interiors: and, judging by the first volume now before us, it should prove to be the most complete treatise on the subject. Herr Muthesius starts from the British period and then follows on through Roman, Norman, Elizabethan and later times, tracing the gradual development of the house. Towards the latter part we are shown the work of Sedding, Nesfield, Philip Webb, Norman Shaw and others who by dint of much self-sacrifice and troublous advocacy have educated the public and the rank and file of the architectural profession to appreciate the importance of logical, simple and beautiful surroundings in our home life; while the last section of the book is devoted to the work of Mr. Lethaby, Mr. Newton, Mr. Voysey, Mr. Stokes and other leading architects of the day. The book is excellently illustrated, many of the photographs having evidently been specially taken; and above all it is most thoroughly worked out, each phase of development being adequately shown. Herr Muthesius had the idea of writing such a book when he first came to the German Embassy in London seven years ago, but the extent of the undertaking has hitherto prevented its publication. However, now that the work is finished we must congratulate him on so admirably carrying out his task. The Germans have taken kindly to our domestic work, but they have unfortunately been caught with some of our eccentric designers, and have created that terrible New Art; hence, so studious a work as Herr Muthesius's is to be welcomed as likely to educate his countrymen to realize the causes and reasons for modern English domestic architecture, at the same time showing them some of our best work.

* "Das Englische Haus," Part I., by Hermann Muthesius. Berlin: Ernst Wasmuth, 35, Markgrafenstrasse, price 25 marks (about 24s.).



("Modern Cottage Architecture.")

THE BALTIMORE FIRE.

Important Report: Condemnation of Terra-Cotta, Granite, &c.

THE report of Prof. Charles E. Norton on the results of the great fire that swept through Baltimore, U.S.A., last winter is of the greatest interest and value to all architects, engineers and builders; and having been issued by the Insurance Engineering Experimental Station, of Boston, it may be taken as absolutely authentic. Professor Norton says:—

The first thought that occurs to one in looking over the situation is the similarity of conditions prevailing in almost all large cities in the matter of lack of preventive measures in retarding fire spread from build-

ing to building, the lack of protection against exposure-hazard. The second thought brought home by the towering remains of the tall steel-frame buildings is the failure of the word "fireproof" to give any proof of its right to exist as applied to such buildings.

The danger of spread of fire through the whole of such a district needed no new emphasis. Boston, Chicago, Paterson and other cities had shown that none of the preventive measures in use in such cities would avail against a fire started during a gale of wind in a district composed largely of buildings of inferior construction. What happened in Baltimore is likely to happen in New York or Boston if once a fire gets well under way. The danger is not so great,



MODERN BEDROOM WITH CHERRYWOOD FURNITURE AND DOVE-GREY WALLPAPER. FRANK BRANGWYN, A.R.A., PAINTER AND DESIGNER. ("The British Home of To-Day")



ENTRANCE DOORWAY IN DINING-ROOM, BREDENBURY COURT, HEREFORDSHIRE. E. GUY DAWBER, ARCHITECT.
("The British Home of To-Day.")

perhaps, in some other cities as it was in Baltimore, but its presence must be admitted.

Fire Shutters.

Fire has apparently in this case found its way from building to building through doors and windows and through roofs which offered but slight resistance. There were buildings in this district equipped with tinne- and sheet-iron shutters and some with other protective devices, but few or none with wood against the enormous volume of flame, and hot gases coming from the majority of partially protected or unprotected risks. There is nothing new in this, but it is a condition so common and so dangerous as to bear repeated references.

I am satisfied that with roof hydrants having a good supply of water, and the universal use of wired-glass and tinne- shutters and metal-covered sash in this district, the Baltimore fire of 1904 had been relatively a small conflagration. And, further, the systematic use of these three preventive appliances and sprinkler systems in other cities where they are not in use would greatly decrease the conflagration risk.

Condition of the Buildings.

The second and more interesting line of suggestion comes from a minute study of the condition of some seventeen so-called "fireproof" buildings in the burned district. Some of these are untouched. Some are sadly damaged. Let us see why their conditions are so different, and why some fared so badly.

It is apparent at once

that some of the buildings are intact in large part because of their having been less vigorously attacked by the fire than were the others, and for no other apparent reason.

These buildings being low, surrounded by taller neighbours, or situated on street corners, seem to have been actually jumped over by the wave of combustion. There is ample evidence that the outside of these buildings did not rise in temperature to the igniting point of wood or paint. On some of them not even the skylights are broken, and an almost incredibly small amount of damage

was done to their exterior. In most cases the buildings may be said to have been without a severe fire trial.

Effectiveness of Small Window Area: Frailty of Stone.

A second group of fire-resisting buildings includes those which have been well described by the word "monumental." The Court House and City Hall offer examples of this type, being heavy stone buildings with comparatively few window openings. On the whole, these monumental buildings demonstrate the effectiveness of a minimum window area in reducing the danger of ignition. They further call attention to the frailty of stone.

Steel-Frame Buildings.

The modern steel-frame construction, popularly called "fireproof," was exemplified by some half-score of buildings in the edge and centre of the burned area. These buildings furnish material for much study, and from their defects as here demonstrated I have no doubt that we may learn much that will go far to prevent even the partial destruction of such buildings built in the future.

The general condition of the steelwork itself is apparently good, except in a few instances. Neither the fire, nor corrosion preceding the fire, has sensibly affected it, if we may judge from its appearance. The "fireproof" buildings of steel-frame construction in general show failures along the same lines. Where the walls are substantial and of good red brick, they stood the test fairly well. There was some spalling and in some cases a crumbling, but good red bricks seem to have lived up to their earlier reputation. Where brickwork of a lighter colour



NO. 2, WEST DRIVE, STREATHAM PARK. LEONARD STOKES, ARCHITECT. ("The British Home of To-Day").

ornamented with terra-cotta was used considerably more damage was noticeable, especially after the slight snowstorms of the week following the fire. Stone trimmings, almost universal on the lower fronts, demonstrated the unfitness of that material beyond all question. Granite, marble, sandstone and limestone all fared about alike, even when, as near as can be ascertained, very little or no water was thrown upon them. In general, all outside wall material suffered, but brick much less than the rest.

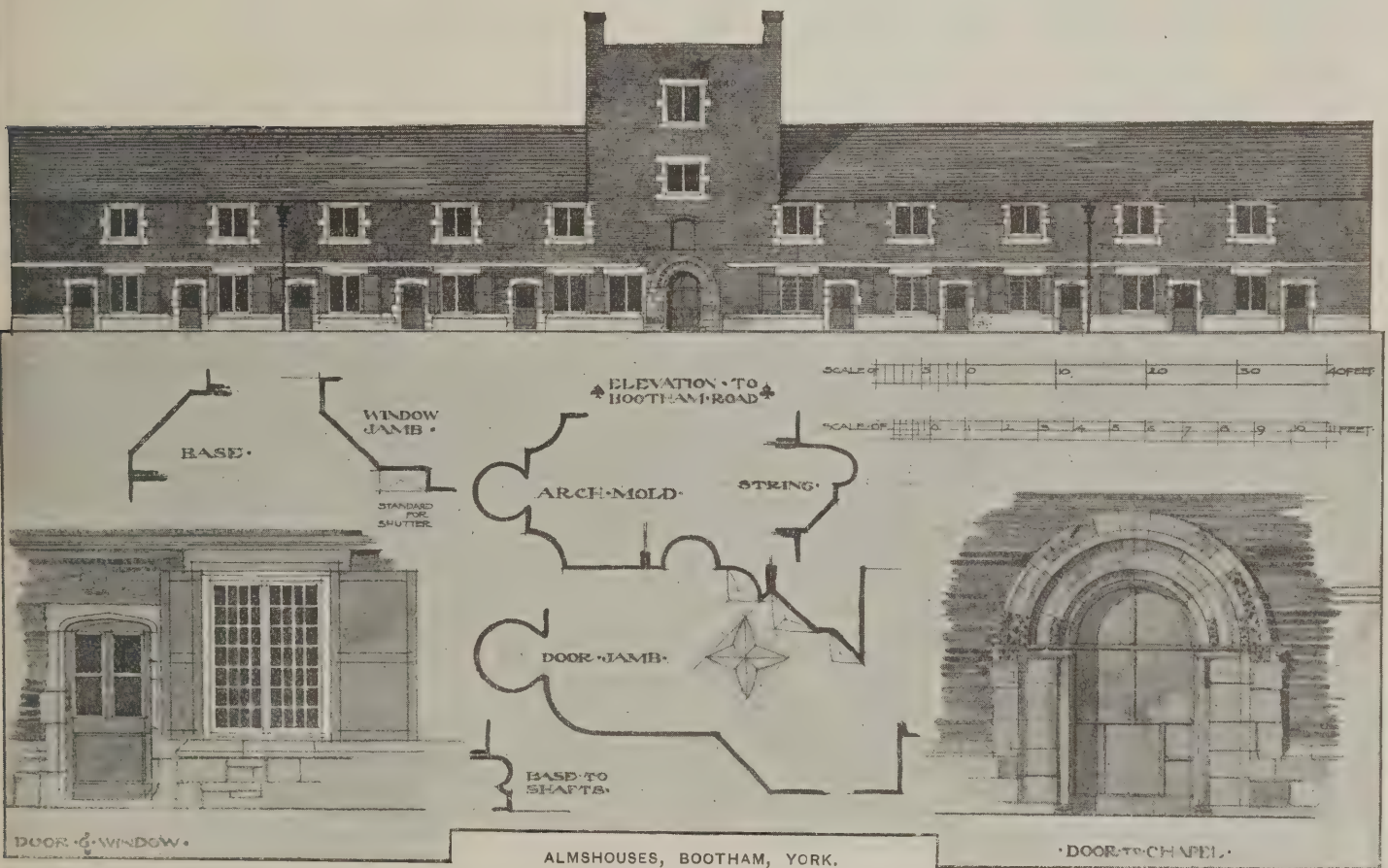
It has already been said that the steel frames themselves appeared in good condition. Exceptions to this may be found in the Equitable Building and in the upper storeys of some of the others. None of these frames, however, collapsed, and none are

plaster and cinder mixture. Generally the covering served its protective purpose well, but was itself destroyed or badly damaged. A very large percentage of the terra-cotta and lime-teil block must be replaced, and it is the general, almost universal, condition that the beam covering of the flanges is gone. The loss of terra-cotta beam and post coverings was at least 75 per cent.

Failure of Terra-Cotta Partitions and Floor Arches.

The partitions of terra-cotta and lime-teil are very largely destroyed, and the unfitness of these materials for this purpose seems clear. Many partitions have fallen and more are in such a condition that they must be replaced. Much of the lime-teil is softened and the terra-cotta is cracked or broken, and

sensibly the same rate, and hence when heated do not subject one another to stress, but terra-cotta usually expands about twice as fast with increase in temperature as steel, and hence the partitions and floor arches soon become too large to be contained by the steel members which under ordinary temperature properly enclose them. Under this condition the partition must buckle and the segmental arches must lift and break the bonds, crushing at the same time the lower surface member of the tiles. There is a similar unequal expansion of the top and bottom faces of the separate tiles, which causes the lower faces to expand and shear off. Evidences of this were found everywhere. Further examination of the expansion phenomena points to them as the main source of distress



This hospital was founded by one Sir Arthur Ingram (alderman of York) in 1640. The materials employed are red bricks with stone facings, the roof being covered with tiles.

likely to do so, though some posts and beams were bent or crushed, and some will need to be replaced in nearly every one of the steel-frame buildings. The light steel frame of the somewhat older Equitable Building is seriously injured, and a considerable amount of reconstruction is needed here. Posts are bent and sagged, and beams are badly deflected. It is probable that this light frame was subjected to a great strain from the falling of safes after the plank top floor burned through, the arches of terra-cotta not being strong enough to carry the weight.

The steel frames are not injured by more than 10 per cent., and in some cases by a much less amount, though in the Equitable Building the loss to the steel would seem to be between 50 and 75 per cent., or even more.

The posts and beams in about all these buildings were covered either with terra-cotta or with "lime-teil," a material whose composition appears to be in the nature of a

the bond between blocks is loosened. If metal lath-partitions were in existence to any great extent, they failed as well, for few were in evidence in good order.

The floor arches, of many different spans and of different details of construction, but in the main of terra-cotta or lime-teil, show much the same sort of distress as the partitions. The bond between the tiles is broken, quite generally, and the tiles themselves are cracked and broken in great numbers. The lower face or soffit of the tiles has split off over large areas, and 50 per cent. or 60 per cent. of the terra-cotta floor construction will need to be replaced or reinforced.

Fire Resistance of Concrete Steel.

Where concrete floor arches and concrete-steel construction received the full force of the fire they appear to have stood well—distinctly better than the terra-cotta.

The reasons I believe are these: First, because the concrete and steel expand at

to the whole beam and post covering, floor, arches and partitions. Most of the fallen terra-cotta partitions and the floor bricks were still hard and had a clear ring when struck, though cracked and broken. There was no evidence of any such temperature as that at which the terra-cotta had been baked originally, and the material of the blocks could not have been altered chemically. It will be readily understood that the thin-walled hollow tiles would become heated upon one side much more quickly than would the equivalent area of a solid partition of brick or concrete. Terra-cotta, cinder-concrete and stone-concrete all have about the same heat-absorbing power, or specific heat, and hence the heavier and more solid the partition or floor—in other words, the more material there is in it—the slower will be its rise in temperature and its subsequent expansion.

I question whether any floor containing

so little material on its outer faces as did these hollow blocks could remain sufficiently cool in this fire to avoid serious injury from expansion.

Wood, Marble, Slate, &c.

The minor details of the structure and finish fared badly. Wood is not in evidence except in secluded corners. Marble, slate, plaster—and, in fact, all similar surfacing material—suffered to the point of destruction. The cast-iron stair-frames and rails stood remarkably well in most instances.

Success of Reinforced Concrete.

The building of United States Fidelity and Guarantee Co. is an interesting example of reinforced concrete in the district. As near as I could ascertain, it was subjected to a severe fire, and I found evidence of temperatures up to the softening point of cast-iron. The condition of the lower part of the structure, and apparently of the whole structure, showed the great fire-resisting powers of this type of building. It is of special interest in that the Experiment Station made a preliminary test on an arch of this same type, and of almost this exact thickness and span and weight of metal, which failed because of the slender 6in. posts, and not through the failure of the floor, at the end of three hours and forty minutes' exposure to a fire of 1,700 to 2,000 degs. Fahr.

Further, in the International Trust Co. building a small paper room having a Hennebique floor and ceiling was so intensely heated that at the end of three days the lumps of cast-iron which had earlier been a copying-press and an embossing stamp were still red hot, and yet neither floor nor ceiling show signs of distress. This is the more remarkable in that the walls of the adjoining building fell through the skylight upon the Hennebique floor.

There were in the Commercial and Farmers' National Bank of Commerce concrete floors which stood the fire-test well.

Conclusions.

The general condition of the fireproof building is such as to indicate to my mind the unfitness of terra-cotta for beam and post covering and floor construction as here used when compared with concrete or brickwork.

Secondly, there is no evidence that the tall steel building was subjected to an unusually severe test. While it must be admitted that not enough concrete received the full effect of the fire to make the test a perfectly complete one, when I add to this the experience of several years in examining the action of fire upon concrete I am convinced that had the floors of the Continental Trust or the Calvert Building been of any one of the better class of concrete types, and had the beams and posts been encased in 4in. coatings of sound concrete, then renewal would have required little but plastering.

Little difference in the action of the fire on stone-concrete and cinder-concrete could be noted, and, as I have earlier pointed out, the burning of the bits of coal in poor cinder-concrete is often balanced by the splitting of the stones in the stone-concrete. I never have been able to see that in the long run either stood fire better or worse than the other. However, owing to its density the stone-concrete takes longer to heat through. When brick or terra-cotta are heated no chemical action occurs, but when concrete is carried up to about 1,000 degs. Fahr. its surface becomes decomposed, dehydration occurs and water is driven off. This process takes a relatively great amount of heat. It would take about as much heat to drive the water out of this outer $\frac{1}{4}$ in. of the concrete partition as it would to raise that $\frac{1}{4}$ in. to 1,000 degs. Fahr. Now a second action begins. After dehydration the concrete is much improved as a non-conductor, and yet through this layer of non-conducting

material must pass all the heat to dehydrate and raise the temperature of the layers below, a process which cannot proceed with great speed.

Much has been said about the uncertainty of concrete. The value of concrete in theory is often admitted by those who consider it unwise to use it because of the difficulty of getting the materials properly proportioned, mixed and placed in position. I have never been able to see the force of this. It is quite as easy to lay sound concrete as it is to put somewhat irregular and confessedly brittle blocks of terra-cotta into place with proper bonding. The main difference seems to be that poor concrete reveals its weakness when it falls on "pulling the centres," while terra-cotta is likely to be strong enough to hold itself in position even when it can do little more. Further, a prolonged search revealed only occasional evidence of temperatures as high as 2,400 degs. Fahr., and no instance could be found of real fusion of terra-cotta or brick in them. Occasional evidences of temperature of 2,200 degs. Fahr. were found, but in general there was ample evidence that the temperature of the fire in these buildings had never in most places risen above 1,700 degs. Fahr. This is likely to happen in almost any office building where little care is taken as to the nature of its contents, and must be provided for if these buildings are to be proof against the combustion of their own contents.

It seems apparent that with care steel-frame buildings can be so constructed as to stand the destruction of their contents without injury to the steel and probably without danger to the protecting material or floor arches; that with shutters and wired-glass, the burning of more combustible neighbours may be expected to cause little permanent injury to the structure proper; and that a district composed wholly of such buildings would be reasonably immune from danger of conflagration.

BUILDING ACCIDENTS.

Home Office Recommendations.

THE following memorandum as to buildings in course of construction or repair has just been issued by the Chief Inspector of Factories:—

Certain provisions of the Factory Act relating to the reporting of accidents and examination of steam boilers apply—(1) to premises on which machinery worked by mechanical power is temporarily used in the construction of a building or in structural work in connection with a building, and (2) to buildings over 30ft. in height which are being constructed or repaired by means of scaffolding, whether machinery be used or not; and the person using any such machinery, or employing the persons engaged in construction or repair, is responsible (under penalty) for seeing that the provisions referred to are duly observed.

Reporting of Accidents.

When there occurs on such premises or buildings any accident which causes to a person employed therein such injury as to prevent him on any one of the three working days next after the occurrence of the accident from being employed for five hours on his ordinary work, written notice (form 43) must be sent forthwith to H.M. inspector for the district.* Every such accident should also be entered in a register kept for the purpose in the premises (form 73). And further, if the accident is fatal, or is produced by machinery moved by power, or by a vat or pan containing hot liquid, or by explosion, or by escape of gas or steam, a similar

* If the address of the district inspector is not known, the notice may be forwarded under cover to the Chief Inspector of Factories, Home Office, London, S.W.

written notice (form 43) must also be sent forthwith to the certifying surgeon for the district, whose name and address can be ascertained from the inspector where necessary.

In the year 1903, 115 fatal and 2,044 non-fatal accidents were reported in connection with buildings in course of construction or repair. It is, however, believed that these returns are incomplete, and the inspectors are instructed to take proceedings against the person responsible if notice of accident is not sent.

Steam Boilers.

Every steam boiler used in the places and premises in question must be maintained in proper condition; provided with a proper safety valve, steam gauge and water gauge; and thoroughly examined by a competent person every fourteen months. A signed report of the result of the examination must be entered within fourteen days in a register to be kept for the purpose on the premises (form 73).

If notice of the commencement of a building is given to the inspector he will forward an abstract (form 57) containing a summary of the provisions of the Act relating to buildings.

The official forms (abstract, form 57, price 3d., by post 3½d.; notice of accident, form 43 (25 copies), price 6d., by post 8d.; register of accidents and steam boilers, form 73, price 6d., by post 7½d.) can be obtained, directly or through any bookseller, from Eyre & Spottiswoode, East Harding Street, London, E.C.; Oliver & Boyd, Edinburgh; and E. Ponsonby, 116, Grafton Street, Dublin.

Safety Precautions.

The following suggestions, if carried out, would tend to reduce the number of accidents occurring on buildings in course of construction or repair. They are based upon those contained in a Home Office memorandum issued to the building trade in 1902:—

(1) Every working platform more than 8ft. from the ground should, before being used, be provided throughout its entire length on the outside and at the ends—

(a) with a guard rail fixed at a height of 3½ft. above the platform. Openings may be left for workmen to land from the ladders and for the landing of material;

(b) with boards fixed on edge, rising at least 7in. above the platform and with their lower edges resting or abutting on the scaffold boards. Openings may be left for workmen to land from the ladders.

(2) All "runs" or similar means of communication between different portions of a scaffold or building should be at least 18in. wide. If made of two or more boards they should be so arranged as to prevent unequal sagging.

(3) Scaffold boards forming part of a working platform should be supported at each end by a putlog, and should not project more than 6in. beyond it, unless lapped by other boards, which should rest partly on or over the same putlog and partly upon other putlogs.

(4) Ladders should rise some feet above the place they give access to, and should have a level and solid footing, and be securely fixed at the top point of rest.

(5) Loose putlogs or other timber should not be allowed to remain projecting from the face of the scaffold where hoisting or lowering of material or plant is being carried on.

(6) Where the scaffolding has been sublet to a contractor the employer should satisfy himself, before allowing work to proceed thereon, that it complies with the conditions named above, and that the material used in its construction is sound.

Views and Reviews.

A new Architectural Handbook.

On the old familiar lines it would have been difficult to produce a new architectural handbook with much chance of success, for we have more than enough already of guides to the various styles. This book, however, has been designed to meet the need of more information about English buildings in general, their purposes and their characteristics, than the ordinary reader possesses, and considering how small the work is, and the extent of the ground it covers, the author has succeeded where others would fail. Formerly, every young person seemed to be wanting to know, not what the parts of our buildings meant, but whether they were Saxon, Norman, Early English, and so forth, whereas the desire to-day is to go a step further than that; so this writer, after briefly describing the styles, religious and secular, from Saxon times to the present day, devotes chapters to churches, monasteries, houses, explaining by means of his illustrations the significance of their distinguishing features. It need hardly be said that Mr. Atkinson has had to practise what is commonly called scamping; but while the works from which this little volume is drawn are for libraries and students of riper years, Mr. Atkinson's is really a handy book to be pocketed when we leave home. An abbreviated illustrated glossary is one of its useful features. Another, which few books of the size possess, is a table of the religious orders in England suppressed under Henry VIII. Another (giving the architects' names where possible) is a pretty full dated list of the principal buildings, beginning with Hadrian's Wall, A.D. 120, and ending with Mr. Street's Law Courts, while for an example of overloading, the reader should consult the small map of England which appears as a frontispiece—in that, with Cornwall and most of Devon omitted for want of space, an attempt has been made not only to show on what soil particular industries thrive, but to what an extent our buildings owe their characteristics to natural causes, the woodlands giving an abundance of timber buildings, the chalk downs our flint, &c. Whoever plotted the map has an idea which might well be expanded into a treatise, in which the ugly red sandstone of Cheshire and Lancashire might be contrasted as a building material with the stone of other counties.

"English Architecture," by Thomas Dinham Atkinson, with 200 illustrations. London: Methuen & Co., price 3s. 6d. nett.

Obituary.

Mr. Peter Bibby, of Flint, died last Thursday. He was well known throughout the county as an architect and builder, from which business he retired some years ago.

Mr. Thomas Browne, builder and contractor, well-known in Liverpool, Cheshire and North Wales, died recently at the age of sixty-one. He built up for himself a large business in Chester as a builder and contractor, and carried out many large undertakings.

Mr. Thomas Smith, of Burnley, a builder and contractor, and until recently a member of the Burnley Town Council, died on Wednesday last from injuries he inflicted on himself three weeks ago. The statement of his affairs submitted to a meeting of creditors showed that of liabilities £11,500, £9,280 were fully secured, and the total deficiency was not expected to exceed £1,200.

Mr. J. Athron, J.P., of Doncaster, died recently at the age of seventy-two. As a contractor he was entrusted with the erection of several important public buildings, including the Corn Exchange, the Grammar



Condition of Work on Saturday, June 4th.

School, the wing to the Market Hall, the Corporation sewage pumping-station, St. Andrew's Church in Marshgate, St. George's School, and other buildings. He succeeded to his father's business in 1854, and afterwards took the late Mr. Dennis Gill into partnership.

RAILWAY ROOFS.

A Rapid Piece of Work.

MESSRS. GRAHAM, MORTON & CO., LTD., of Leeds, pride themselves on having accomplished a very rapid piece of roof erection at the Central Station, Leeds. To appreciate the work one needs only to compare the two photographs reproduced on this page, showing the first section of the work.

The contractors received the order at 4.30 on Friday afternoon, May 20th, but as business was suspended on account of the Whitsuntide holidays, and the workshops were closed, operations were not started before May 25th. The erection of the ironwork was begun at 10.30 on Saturday night, June 4th, and by 6 a.m. on Monday, June 6th, the first section of the work necessary to the carrying out of the first part of the contract was completed,

the time taken being precisely thirty hours. The second part of the contract was commenced at 10.30 p.m. on Saturday, June 11th, and by noon on Sunday, June 12th, the last piece of ironwork was lifted into place; which gives twelve working hours additional to the thirty hours of the previous week, making a total of forty-two working hours. The whole of the work was completed by 6 a.m. on Monday, June 20th, so that taking the date of commencement of the erection as the night of June 4th it will be seen that the actual period occupied by the carrying through of the contract from the time the erectors were upon the ground was less than sixteen days. It is interesting to note that the time limit fixed for the completion of the contract does not expire until July 25th, just five weeks later.

The following particulars of the work will be of interest:—Number of principals, 26; of columns, 36; of cantilevers, 36; of lattice-girders, 15; of panes of glass, 462; total weight of ironwork, 118 tons; area covered by glass 5,800 sq. ft.; working area of station and platform covered, 28,700 ft.; approximate area of Vieille Montagne zinc for covering, 12,500 sq. ft.; area of tongued and grooved matchboarding, 15,500 sq. ft.



Condition of Work on Monday, June 6th—Two Days Later.

THE ERECTION OF A ROOF AT LEEDS CENTRAL STATION.
GRAHAM, MORTON AND CO., LTD. STEELWORK ENGINEERS.

A CENTURY OF BUILDING PRICES.—VII.

By T. E. COLEMAN, F.S.I.

(Concluded from p. 287, No. 488.)

A GENERAL review of the leading items and prices which have been indicated for different periods since 1776 shows that the cost of excavating has increased comparatively but little up to the present time, although the labour rates themselves have more than trebled during the same interval. This economy of cost has no doubt been largely influenced by the more systematic methods and improved appliances now generally employed, whilst for the huge excavations required in large and important engineering works a further saving is effected by the use of excavating machinery of various kinds.

For bricklayer's work, the prime-cost of stock bricks delivered on a London site averaged about 20s. per thousand in 1776, 42s. in 1811, and at the present time may be taken at 40s. per thousand. At the beginning of last century all imported bricks and tiles were subject to duty, but in 1850 this tax was abolished. The labour rates for bricklayers have gradually increased from approximately 3d. per hour in 1776 to 5½d. or 6d. per hour in 1811, with a further steady increase up to 10½d. per hour at the present time; whilst the cost of ordinary stock brickwork in mortar has varied, on a rough average, from £8 per rod in 1776, £18 per rod in 1811, £13 in 1859, to £17 per rod in 1904. Portland cement, now so largely used on building and engineering works, is considerably cheaper than when first introduced, owing to keen competition and improved methods of manufacture. In 1843 the price of Portland cement averaged about 3s. 6d. per bushel, 3s. in 1852, 2s. in 1890; the rate at present being about 1s. 9d. per bushel.

The wages for carpenters and joiners exhibit the same relative increase as already noticed for bricklayers. During the period under review the cost of fir timber has fluctuated very considerably. In 1776 fir timber was quoted at 2s. per ft. cube, including trade profit; in 1811 it had risen to 8s. per ft. cube; but in 1826 the average price had decreased to 4s. per ft. cube. Further reductions took place from time to time, so that in 1859 we find the retail price of fir timber to be about 2s. 9d. per ft. cube, the present price being about 2s. per ft. cube.

The comparatively high prices paid for fir timber and deals during the early part of the last century were chiefly due to the heavy import duties then levied. So far back as the time of Charles II. we find that a customs duty was laid on all imported timber, and it is interesting to trace some of the more important fluctuations which occurred at different dates, until the tax was repealed in 1866. In 1660 the import duty on timber was as follows:—

	Per 120.	s. d.
Great balks (8in. square and upwards)	- - -	12 0
Middle balks (over 5in. square and under 8in. square)	- - -	5 0
Small balks (5in. square and under)	- - -	2 0

In 1714 the duty on great balks had risen to 60s. per 120, 25s. for middle balks and 10s. for small balks. Considerable alterations and additions were afterwards frequently made, and on war being declared by France against this country in 1793 still further additions were imposed in order to meet the demands of the heavy war expenditure. At this time the duties on timber were very complicated, for the rates not only varied according to the country from which it was exported but also upon the nationality of the carrying vessels—that is to say, whether the timber was carried in British or in foreign ships. The most favourable rates were given to timber imported

from British colonies and when carried in British ships. In 1798 certain special duties, called "convoy duties," were levied on all imports and exports in order to pay the cost of conveying merchant vessels by war-ships, and thus guarding against their capture by the enemy. Any British merchant ship sailing without convoy was liable to a penalty of £1,000.

The following rates may be taken as representing the average duty paid on all imported timber in 1805:—

	Per 120.	s. d.
Deals 8ft. and not exceeding 20ft. long and not exceeding 3in. thick	- - -	8 3 2
Ditto ditto not exceeding 4½in. thick	- - -	16 6 4
Ditto exceeding 20ft. long and not exceeding 4in. thick	- - -	20 4 0
Ditto ditto not exceeding 4½in. thick	- - -	39 7 8
Balks under 5in. square and under 24ft. long	- - -	3 11 0
Balks 5in. square and under 8in. square, or if 24ft. long and upwards	- - -	9 11 3
	Per load (50ft. cube).	s. d.
Oak or fir timber	- - -	1 5 6

In 1816 the timber duties were considerably increased, the average rates being as follows:—

	Per 120.	s. d.
Deals 8ft. and not exceeding 20ft. long and not exceeding 3½in. thick	- - -	20 15 7
Ditto exceeding 20ft. long and not exceeding 4in. thick	- - -	51 9 2
Ditto ditto exceeding 4in. thick	- - -	100 6 1
Balks under 5in. square and under 24ft. long	- - -	18 2 7
	Per load (50ft. cube).	s. d.
Balks 5in. square and under 8in. square, or if 24ft. long and upwards	- - -	3 4 6
Oak or fir timber	- - -	3 4 11

In succeeding years these rates were greatly modified, and in 1826 the duties were approximately as follows:—

	Per 120.	s. d.
Battens 6ft. and not exceeding 16ft. long, not exceeding 7in. wide and not exceeding 2½in. thick	- - -	10 0 0
Ditto exceeding 16ft. and not exceeding 21ft. long and ditto	- - -	11 10 0
Deals 6ft. and not exceeding 16ft. long, above 7in. wide and not exceeding 3½in. thick	- - -	19 0 0
Ditto exceeding 16ft. and not exceeding 21ft., above 7in. wide and not exceeding 3½in. thick	- - -	22 0 0
Balks under 5in. square and under 24ft. long	- - -	18 2 7
Ditto ditto and over 24ft. long	- - -	27 0 0
	Per load (50ft. cube).	s. d.
Oak or fir timber	- - -	2 15 0

The elaborate and complicated scale of duties levied on imported timbers were eventually consolidated in 1819, and from this period they gradually diminished until the year 1860, when the tax was reduced to an almost nominal rate. The timber duty was eventually repealed in 1866 (29 & 30 Vict., c. 36), the tax being at that time 1s. per load of 50 cub. ft. of hewn wood and 2s. per load on sawn timber.

The extensive use of machinery for sawing timber, preparing floor-boards, planing, and similar preparatory work has considerably reduced the cost of a large quantity of the manufactured wood goods used in building, notwithstanding the great increase which has taken place in the rates of wages from time to time. Allowing for the comparative difference in the purchasing value of money, we find that on the whole the average cost of carpenter's and joiner's work is at the present time relatively less than a hundred years ago.

Articles of ironmongery can now be obtained in much greater variety and at lower rates than formerly, whilst further improvements in design, material, or manufacture are frequently being devised. The same remarks apply to every branch of smith's and founder's work. Owing to the machinery now employed and the special training of workmen for the wholesale manufacture of goods of a similar description, together with the increased facilities of carriage and distribution now enjoyed, the output of ordinary manufactured iron and steel goods used in building and engineering works has reached enormous dimensions and

has been accompanied with a corresponding reduction in price. At the beginning of last century there was a very heavy duty on all iron imported into this country. In 1800 the duty on imported iron amounted to £3 4s. 7d. per ton, exclusive of a convoy duty of 10s. 10d. per ton. In 1805 the following duties were imposed:—

	per ton	£ s. d.
Iron in bars or unwrought	- - -	5 0 0
Ditto in rods less than ¾in. square	- ditto	14 19 0
Cast-iron	- - -	44 12 6

In 1816 the duties on iron were still further increased, and were as follows:—

	per ton	£ s. d.
Iron in bars or unwrought	- - -	6 9 10
Ditto in rods less than ¾in. square	- ditto	20 0 0
Cast-iron	- - -	31 13 4

During this period ironwork generally was very expensive and comparatively but little used in ordinary building operations, for the great development of the iron industry had not then taken place.

The health value of unlimited supplies of light and air in dwelling-houses is now fully appreciated, being to a certain extent safeguarded by legislative measures, but a hundred years ago no importance appears to have been attached to these important factors in the welfare of the community. The streets of our cities and towns were narrow and tortuous, whilst the rooms of ordinary houses were very badly lighted and ventilated, the windows being both small and few in number. The restricted size and numbers of the windows was largely influenced by the fact that not only was glass expensive in itself, but a very heavy window tax was also annually levied upon the occupants of the houses. For many years all glass imported to this country was subject to a customs duty. In 1746 the duty amounted to 8d. per lb. on crown, plate or flint glass, and 2d. per lb. on green or other glass. In 1800 the import duty was as follows:—

	per £100 value	£ s. d.
Glass	- - -	88 0 0
Convoy duties on ditto	- - -	3 0 0

In 1805 the duty on glass had risen to £89 5s. per £100 value, whilst in 1816 the rate was £114 per £100 value, with a further duty of 1s. 3d. per ft. super. on German sheet glass and 3s. 1½d. per ft. super. on plate glass.

At the beginning of last century the old window duty was severely felt, and it is probable that this tax accounted for the comparatively few windows which were provided in ordinary houses. In 1822 the tenant of a dwelling-house containing six windows was charged 6s. 6d. per annum, payable from April 5th of each year. For ten windows the duty amounted to £2 16s. per annum; £11 4s. 6d. for twenty windows; £34 10s. for fifty windows; £58 17s. for one hundred windows; £93 2s. 6d. for one hundred and eighty windows, and 3s. each for every window exceeding that number. In 1827 the window duty amounted to 3s. 3d. for houses with six windows; £1 8s. for ten windows; £5 12s. 3d. for twenty windows; £17 5s. for fifty windows; £29 8s. 6d. for one hundred windows; £46 11s. 3d. for one hundred and eighty windows, and 1s. 6d. each for every window exceeding that number. In 1837 houses containing less than eight windows were exempt from the tax, but for dwellings containing a greater number of windows the duty remained as already mentioned for 1827.

The cost of plumber's work generally is now considerably less than at the beginning of last century. This is chiefly due to the decrease in cost of pig lead, and also to the improved methods of manufacturing sheet lead, pipes, bends, &c. Drawn lead pipes and bends as now made are both cheaper and better than the old form of soldered pipe-work. Similar improvements and reduction in cost are also seen in plumber's brass-work and sanitary appliances of every description.

If we now consider the purely labour side

of the cost of building during the past hundred years, we find that a considerable increase has taken place in the rates of wages paid to workmen in all branches of the building trade, and also that this upward movement has been especially marked during the latter half of the century. The following table shows approximately the average rates of wages at different dates in the London district. During the earlier part of the last century it was customary to calculate the wages of workmen at per day, instead of per hour; but for greater convenience of comparison the labour rates for the entire period under review have been reduced to the hour standard. The rates given for the last thirty years have been chiefly compiled from the reports of the standard time rates of wages which are issued annually by the Labour Department of the Board of Trade. These annual reports are based upon the returns furnished to the Board of Trade by the various labour and trade associations.

COMPARATIVE TABLE SHOWING THE AVERAGE RATES OF WAGES PER HOUR IN THE LONDON DISTRICT DURING THE PAST 100 YEARS.

Date.	Labourers.	Bricklayers.	Masons.	Carpenters or Joiners.	Plasterers.	Plumbers.	Smiths.	Painters.
1800 -	d. 3	d. 5	d. 5	d. 5	d. 5	d. 5	d. 5	d. 4½
1820 -	3½	6	6	6	6	6	6	5½
1840 -	3½	6	6	6	6	6	6	6
1850 -	4	6½	6½	6½	6½	6½	6½	6½
1860 -	4½	7	7	7	7	7	7	6½
1870 -	4½	8	8	8	8	8	8	7½
1873 -	4½	8½	8½	8½	8½	8½	8½	8
1875 -	5	9	9	9	9	9	9	8½
1882 -	5	9	9	9	9	10	8½	8½
1888 -	5½	9	9	9	9	10	8½	8½
1894 -	6	9½	9½	9½	9½	10½	9	8½
1897 -	6½	10	10	10	10	10½	9½	8½
1900 -	7	10½	10½	10½	11	11	10	8½
1904 -	7	10½	10½	10½	11	11	10	8½

It will be seen that the greatest relative increase in the rates of wages has been secured by ordinary labourers or unskilled artisans. The current rate of wages for labourers is now double the amount ordinarily paid a hundred years ago. Of skilled workmen, the plasterers and plumbers have obtained the greatest increase in labour rates. During the first half of the century the rise in wages was gradual, but comparatively slight as compared with the increase obtained in the latter half. In 1850 the average rate for labourers was about 4d. per hour, but in 1875 their wages had increased by 25 per cent. to 5d. per hour; in 1894 a further advance of 20 per cent. had been obtained; whilst in 1900 the standard rate for labourers was 7d. per hour, or a total increase of 75 per cent. during the last fifty years.

Similarly, bricklayers, masons and carpenters were receiving about 5d. per hour in 1800 and 6d. per hour in 1840, but in 1875 the average London rate was 9d. per hour, being an increase of 50 per cent. in thirty-five years, whilst in 1900 the rate of wages had advanced to 10½d. per hour, or a further increase of 17 per cent. During the sixty years from 1840 to 1900 the wages for workmen in these trades have therefore risen by 75 per cent., whilst in the case of plasterers and plumbers the increase has been slightly greater.

This general increase in the rates of wages has been further accompanied by a considerable decrease in the number of hours now constituting a working day. The ordinary working day formerly consisted of ten hours, or sixty hours per week; but in 1870 the working week was reduced to fifty-four hours, or nine hours per day. Since 1900 the recognized working week for the building trades in the London district may be taken to average forty-eight hours per week, or eight hours per day. It is scarcely any exaggeration therefore to say that many first-class workmen

at the present time are in a position to secure "eight hours work, eight hours play, eight hours sleep and eight shillings a day" without much difficulty.

The list below shows the current rates of wages and hours of labour paid and observed by the London County Council. This public authority also requires that all contractors for building works executed for them within a radius of twenty miles from Charing Cross shall "pay wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in this list." The schedule of labour rates is revised from time to time by the County Council when any alterations in London wages have been determined by the employers' associations and the trade unions.

With regard to the labour rates current in the different provincial cities and towns, these vary considerably according to the district and local circumstances; but generally wages in all parts of the country are decidedly lower than those paid in London, where the cost of living, &c., is much greater. The same comparative improvement in the country rates of wages has, however, taken place to that already indicated for the London district. The following tables indicate the principal variations which have occurred in the more important building trades at the chief provincial cities and towns within recent years, viz. :—

BRICKLAYER'S RATES OF WAGES. (Per hour.)

District.	1875.	1885.	1895.	1904.
Birmingham -	d. 7½	d. 8	d. 9	d. 9½
Brighton -	6	7	8	8½
Bristol -	6	7	8	8½
Cardiff -	7½	7½	8½	9
Leicester -	7	7½	8	9
Liverpool -	7½	8	9	9½
Manchester -	8½	8½	9½	10
Newcastle -	8½	8½	9	10
Norwich -	5	6	6½	18
Nottingham -	7½	8	8½	9
Portsmouth -	6	7	8	8½
Wolverhampton -	7	7½	8	9

MASONS' RATES OF WAGES. (Per hour.)

District.	1875.	1885.	1895.	1904.
Birmingham -	d. 8	d. 8½	d. 9	d. 9½
Brighton -	7½	8	8	9
Bristol -	7½	7½	8	8½
Cardiff -	7½	7½	8½	9
Leicester -	8	8½	8½	9
Liverpool -	7½	8	9	9½
Manchester -	8	8	9	9½
Newcastle -	8	8	9	10
Norwich -	6	6½	6½	8
Nottingham -	7½	8	9	9½
Portsmouth -	6½	7½	8	8½
Wolverhampton -	7½	8	8½	9

CARPENTERS' AND JOINERS' RATES OF WAGES. (Per hour.)

District.	1875.	1885.	1895.	1904.
Birmingham -	d. 7½	d. 8	d. 9	d. 9½
Brighton -	6½	7½	8	8½
Bristol -	7	7	8	8½
Cardiff -	7½	7½	8½	9
Leicester -	7	7½	8	9
Liverpool -	7½	8	8½	9½
Manchester -	8	8	8½	9½
Newcastle -	8	8	9	10
Norwich -	5½	6½	7	7½
Nottingham -	7½	8	8½	9
Portsmouth -	6	6½	7	8
Wolverhampton -	7	7½	8	8½

PLUMBERS' RATES OF WAGES. (Per hour.)

District.	1875.	1885.	1895.	1904.
Birmingham -	d. 8	d. 8½	d. 9	d. 9½
Brighton -	6½	7½	8	8½
Bristol -	7	8	8	8½
Cardiff -	7	7	8½	9
Leicester -	6½	8	8	9
Liverpool -	7½	8	9	9½
Manchester -	7½	8	8½	9½
Newcastle -	7½	8½	8½	9½
Norwich -	6	6	6½	8
Nottingham -	7½	8½	8½	9
Portsmouth -	6	6½	7	8½
Wolverhampton -	7	7½	8½	9

LONDON COUNTY COUNCIL RATES OF WAGES (1904).

Trades.	Rate of Pay per Hour.	Hours of Labour per Week.		
		Summer.	Winter—Twelve weeks after second Monday in November.	
			Three weeks at beginning and three weeks at end.	Six middle weeks.
Carpenters -	d. 10½	Hours. 50	Hours. 47	Hours. 44
Joiners -	10½	"	"	"
Bricklayers -	11½	"	"	"
Ditto (cutting and setting gauged work) -	11	"	"	"
Plasterers -	10½	"	"	"
Masons -	11½	"	"	"
Ditto (fixing) -	11½	"	"	"
Ditto (granite work) -	11½	"	"	"
Painters and glaziers -	8½	"	"	"
Smiths, fitters, gasfitters, &c. -	9 to 10	"	"	"
Labourers and navvies -	7	"	"	"
Ditto (employed on night shifts) -	8	"	"	"
Plumbers -	11	47	44½	41½
Plumbers' mates -	7	"	"	"
Granite-set paviors -	10	56½	50½	48
Wood-block paviors -	9	"	"	"
Paviors' labourers -	7	"	"	"
Timbermen -	7½ to 8	50	47	44
Scaffolders -	7½	"	"	"
Hot-water engineers -	9½	"	"	"
Zinc workers -	9½	"	"	"
Bell-hangers -	9½	"	"	"
Paperhangers -	6½	"	"	"
Painters' labourers -	8	"	"	"
French polishers -	8	"	"	"
Mill sawyers and wood-cutting machinists -	8d. to 1s.	"	"	"
Stable-men -	6	"	"	"
Scotch derrick drivers -	9	"	"	"
Steam navy and grab drivers -	9	"	"	"
Drivers of steam cranes and travellers -	8	"	"	"
Stationary engine drivers -	8	"	"	"
Portable engine drivers -	7½	"	"	"
Asphalt paving :—				
Spreaders -	Per day.			
Potmen and labourers -	6s. to 6s. 6d.			
Carmen (employed by contractors) :—	5s.			
One horse -	Per week.			
Two horses -	25s.			
	27s.			

PLASTERERS' RATES OF WAGES. (Per hour.)

District.	1885.	1890.	1895.	1904.
Birmingham	d.	d.	d.	d.
Brighton	8	8½	9	9½
Bristol	7	7½	8	8½
Cardiff	7	7½	8	8½
Leicester	7½	8	8½	9
Liverpool	7½	7½	9	10
Manchester	8	8	9	9½
Newcastle	8	8	9	10
Norwich	7½	8½	9	10
Nottingham	6	6	6½	8
Portsmouth	8½	9	9	10
Wolverhampton	7	7	7½	8½
	7½	8	8	9

PAINTERS' RATES OF WAGES. (Per hour.)

District.	1885.	1890.	1895.	1904.
Birmingham	d.	d.	d.	d.
Brighton	7	7½	7½	8
Bristol	6	6	6½	7
Cardiff	6½	7	7½	8
Leicester	6½	7	7½	8
Liverpool	7	7	8	8½
Manchester	7	7	7½	8½
Newcastle	7	7½	7½	8½
Norwich	4½	5	5	6
Nottingham	7	7½	8	8½
Portsmouth	5½	5½	6	7
Wolverhampton	6½	7	7½	8

As a rule, the provincial rates of wages are generally lower in those country towns which are centres of agricultural districts—such as Norwich, Exeter or Hereford—than in the large and busy manufacturing cities of Manchester, Birmingham, Newcastle, &c. At the same time, there are certain advantages in the matter of cheaper living in the country towns which compensate to some extent for the lower rates of wages.

Speaking generally, the rates of labour in the building trades have risen about 100 per cent. in the last century. During the past fifty years an increase of 70 per cent. has taken place; whilst compared with the rates current thirty years ago the artisan has obtained an increase of 25 per cent. An increase of 10 per cent. has occurred during the past ten years, but the last three or four years have witnessed no changes of any considerable importance.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Examination Papers, Assistant Surveyor, Admiralty.

FORFARSHIRE.—SURVEYOR writes: "Where can past examination papers for the post of assistant surveyor in the Admiralty be obtained?"

These are published by Messrs. Eyre & Spottiswoode, East Harding Street, E.C., and are obtainable through any bookseller, the price being 1s. for each set. G. A. T. M.

Buildings on South Coast.

LONDON.—MARINA writes: "Kindly name some seaside places where I could find work suitable to measure for the R.I.B.A. intermediate—south coast preferred."

See answer given on p. 145 of our issue for March 23rd last.

The New Sessions House.

HORSHAM.—STUDENT writes: "(1) Have any of the accepted plans of the new Sessions House, Old Bailey, been published? (2) Is it possible to go over the buildings whilst in progress?"

(1) Yes, you will find them in our issue for July 27th, 1900. (2) If you applied to the architect, Mr. E. W. Mountford, 17, Buckingham Street, Strand, he would doubtless give you permission to visit the work; or you might ask the clerk of works.

Office of Works.

GREAT MALVERN.—OFFICIAL writes: "I am thinking of studying for an appointment in the Office of Works, either as assistant architect and surveyor or clerk of works. Should I be coached or attend classes?"

For any position under the Office of Works it is first necessary to get on the temporary staff. To effect this, application should be made to the chief surveyor, stating all particulars as to age, qualifications and experience, and enclosing copies of testimonials. Members of the temporary staff

are nominated as vacancies occur, to compete amongst themselves for positions on the permanent staff, a selection being exercised and only the more competent men chosen to compete. The experience of all competitive examinations is that the candidate who is prepared by a specialist stands much the best chance of success, though the fees are necessarily high in comparison with those for class teaching. M.

Exploiting a Patent.

FOREST GATE.—S. J. writes: "Kindly name some agents who would purchase the sole right of an invention relating to drawing material."

Your best plan would be to place the matter before firms like Reeves, Rowney, Windsor & Newton, or Eyre & Spottiswoode. But you must not expect a fortune from them.

Lead-Lined Iron Pipes.

HARPENDEN.—A. H. S. writes: "Middleton in his book on the drainage of town and country houses says that the best pipes for drainage purposes are the lead-lined iron pipes of the Sanitary Lead Lining and Pipe Bending Co. I have written to this firm at Cremorne Wharf, Chelsea, but have received no reply. Is this the right address? Are these pipes often used? How do they compare with (a) earthenware laid in concrete, (b) iron coated with Dr. Angus Smith's solution, (c) glass-glazed iron pipes, as regards lasting properties and also as to first cost?"

Lead-lined iron pipes are made by the Sanitary Lead Lining and Pipe Bending Co., of 149, Lupus Street, S.W., and are largely used, especially where good-class work is required to be done quickly, as sometimes needed for hurried City jobs. They have been used by H.M. Government in hospitals and other public and private buildings. The pipes are mostly employed for soil, ventilating, waste and rainwater pipes. For these purposes they may be considered very satisfactory, and preferable to iron pipes having a thin coating only of glazing or other preservative solution. The question of initial cost must be considered in connection with the saving due to the simplicity and rapidity of fixing; it is claimed that a soil pipe on this system, compared with an ordinary 8lb. lead soil pipe, saves time, labour and money, and assures better results. The pipes have been awarded the medal of the Sanitary Institute. W. H. M.

Right of Builder to take away Men.

UNO writes: (1) Can you refer me to a case in which it was decided whether a builder was justified or not in taking his men away from a building when circumstances had arisen proving it doubtful that he would receive his money promptly? (2) Assuming there is no clause in the contract bearing on the point, would the builder be liable for the cost incurred in completing, over and above the balance of his contract?"

(1) See *Freeth and Burr* (1874) L.R. 9 C.P. 208, which authorizes the following: "Non-payment of an instalment which is due does not in itself (in the absence of a special clause in the contract) excuse the contractor for refusing or delaying execution of his part of the contract. But the circumstances may show an intention to abandon or an incapacity to perform the contract." Lord Coleridge said: "The principle to be applied in these cases is, whether the non-payment amounts to an abandonment of the contract, or a refusal to perform it on the part of the person so making default." (2) If there is no such clause it would depend on the facts of the case whether he were justified in suspending the work or not. If he were, he would not be liable to pay damages. If he were not justified, he would be liable to pay the difference, i.e., the excess, if any.

S. P. J. M.



THE BUILDING OF HOYLE'S WAREHOUSE, MANCHESTER (Photograph taken on June 30th).
CHARLES HEATHCOTE AND SONS, ARCHITECTS.

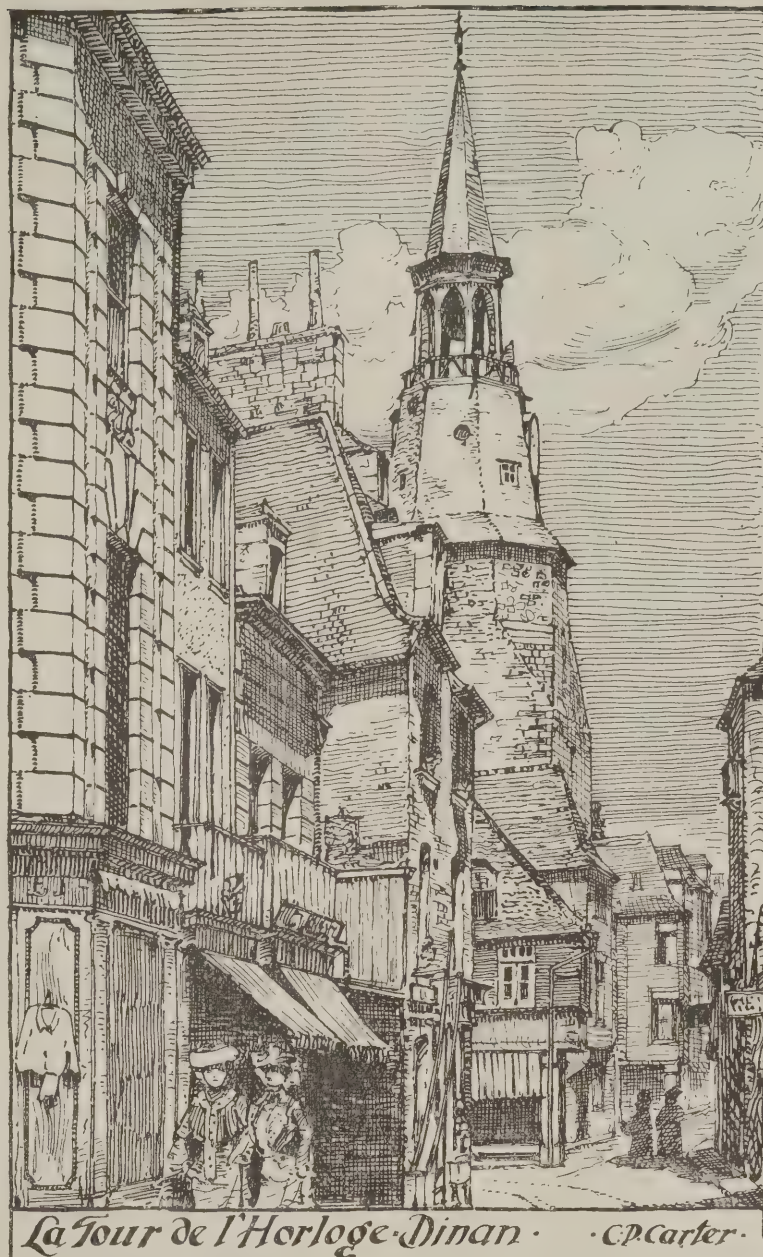
We give this week a view taken on June 30th, one month later than the photograph last illustrated (in our issue for June 15th). This shows the rapidity with which the terra-cotta and brickwork are being erected around and on the steel framing. The steelwork visible is that of the top floor; it has been virtually completed for some weeks.

Bricks and Mortar.

Aphorism for the Week.

*Suburban villas, highway-side retreats,
That dread the encroachment of our growing
streets,
Tight boxes, neatly sashed, and in a blaze,
With all a July sun's collected rays,
Delight the citizen, who, gasping there,
Breathes clouds of dust, and calls it country
air.*
COWPER.

Our Plates. "PORTLEY WOOD," Whyteleafe, Surrey, has been built on high ground and occupies a beautiful site of about three acres, surrounded by fine trees. The walls are of red bricks, the upper portion being hung with tiles. The barge-boards and timbering in the gables are of oak, left rough from the saw. The posts of the loggia (which has a black and white marble floor) are of old ship oak, also left rough. The house contains on the ground floor, besides the kitchen and usual offices, a dining-room, library and billiard-room, but no drawing-room, in accordance with instructions, its place being taken by the loggia, which commands beautiful views of the adjacent country and is practically an open-air sitting-room, being used for several of the daily meals in the summer. Owing to the fall of the ground there is a sub-ground floor under part of the house, and in this are situated a carpenter's shop, wine and coal cellars, larder, and fruit store; also the Grundy heating apparatus. On the first floor there are five bedrooms, two dressing-rooms, hanging and linen rooms, bathroom, &c. The top floor contains four bedrooms, box-room and cistern room. The earth system was employed by special desire of the owner, the bath and other wastes being taken to a cesspool and used for garden purposes, for which there is also a tank receiving the rain-water from the roofs. The cost, including the entrance lodge, was about £3,500. Mr. Walter E. Hewitt, A.R.I.B.A., of 22, Buckingham Street, Strand, was the architect, and the late Mr. D. Debenham, of Bletchworth, the builder. A view of the house was hung in the Royal Academy of 1901.—The house designed by Mr. Voysey to be built at Bracknell Gardens, Hampstead, N.W., was to be faced with red bricks 9in. by 1½in., with wide white joints running six courses to the foot. The roof was to be of hand-made sand-faced red roofing tiles, and the window dressings and other stonework of Portland. The house was planned to have all the best rooms facing south and overlooking the garden. This entirely commended itself to Mr. Voysey's client, but the vendor of the land objected, and in consequence the matter fell through.—The premises Nos. 135, 136, 137, New Bond Street, W., which originally comprised the Grosvenor Club (the old Grosvenor Gallery) and a library, have undergone extensive alterations for the Orchestrelle Co., of New York. The whole of the ground floor entrance has been made into one large hall panelled in oak with Verde Antico marble columns and pilasters, four of the columns being monoliths which help to carry the weight of the upper part of the building. The original staircase remains, but has been panelled and divided according to the requirements of the L.C.C. and an open arcade formed on the right-hand side. This staircase gives access to the concert hall at the back, which seats rather more than 400. The original skylight has been marked by an inner panelled ceiling, and windows have been opened on the west side with corresponding niches on the east wall. The panelling is of mahogany, stained dark brown, with inlaid pilasters. The stage and organ case are of oak stained dark. The doors are covered with leather. A new exit staircase has been formed at both ends of the hall and the whole has been



La Tour de l'Horloge-Dinan. · C. Carter.

carried out to suit the requirements of the L.C.C. Licensing Committee. The rest of the premises contain various large show-rooms and accommodation for the staff and in the basement are extensive workshops and store rooms for instruments. The builders were Messrs. J. Simpson & Son, of Paddington Street, W. The heating and ventilating was done by Messrs. R. Crittall & Co. under Mr. E. Wingfield Bowles. Mr. Frith did the plaster modelling and Mr. Knox the woodcarving. All the brasswork has been executed by Mr. W. Bainbridge Reynolds, and the whole carried out under the direction of the architect, Mr. Walter Cave.

Bagatelle; Paris.

THE mansion or villa known as Bagatelle, on the west side of the Bois de Boulogne, Paris, is now in the market in consequence of the death of its late owner, Mr. Scott, and it is proposed by the Paris Municipal Council to acquire the property for the purpose of enlarging the Bois, which was presented to the Council by the Emperor Napoleon III. The price asked by Mr. Scott's executors is seven million francs or £280,000, and the Municipal Council has agreed to recommend the purchase of the property for £260,000. In the event of failure of the negotiations the Municipal Council proposes to take steps for the compulsory purchase of the mansion

and grounds as a measure of public utility. The executors have commenced to dismantle the park and have, it is said, sold one of the statues by which it was adorned to M. de Rothschild for £1,840. The mansion was erected from the designs of the architect François Joseph Bellanger in 1779, and is said to be the outcome of a wager between the Prince of Wales, afterwards George IV., and the Count d'Artois, afterwards Charles X., that the mansion could not be built in three months; it was actually finished in fifty-eight days. The architect Bellanger designed the cupola of the Halle aux Vins at Paris, begun in 1811 and finished in a twelvemonth. He was also instrumental in procuring the restoration of the statue of Henry IV. on the Pont Neuf, which had been removed during the Revolution, and is said, on the authority of a letter addressed by him to the National Assembly while in prison, to have been the first to introduce the use of wallpaper into France.

Architects' Registration: An American Side-light.

THE following editorial note appears in the "American Architect" for June 25th:—The real value of the architect's license laws that have been adopted by sundry States appears to have been logically determined by a justice of the Supreme Court of New Jersey a few days

ago, in a manner that can hardly please the advocates of such laws. Attempt to disguise it how they will, the object of the promoters of these laws squints more at effecting a "restraint of trade" than at throwing greater protection about the public, which is the assigned reason for their formulation. In the case in question the State Board of Architecture had declined to issue a license to Mr. Newman H. Raymond, of Jersey City, on the ground that he was not a practising architect but was merely a builder. The Court set this decision aside and ordered the Board to issue a license to the applicant on the ground that he had studied architectural construction and had prepared the plans and specifications in accordance with which thirty-seven buildings had been satisfactorily erected. As no State has attempted to rest the issue of a license on the artistic competency of the applicant, the public has no means of knowing whether a "licensed architect" may not be the veriest Philistine in matters of design; it only knows he is competent to build safely, and now that it is determined that a builder who safely executes his own design may secure a license as an "architect" the profession, in New Jersey at least, seem likely to find that in place of narrowing the field they have widened it, and made its boundaries less definite than before. We have always felt these license laws to be ill-advised, and that it should be left to the architectural societies, with their examinations, to determine "who is who" in the profession.

Keystones.

Savoy Hotel Extensions.—The address of the British Steel Corner-Plate Co., referred to on p. 12 of last week's issue, is 181, Queen Victoria Street, E.C., not "101" as given.

Competition for New Library at Loughborough.—Eight sets of plans were sent in. The Loughborough Town Council have selected the design submitted by Messrs. Barrowcliffe and Allcock.

Mr. Alfred Burgess, of Twickenham, consulting engineer, specialist in the engineering work of public baths and similar institutions, has removed to more central offices at 28, Victoria Street, Westminster, S.W.

A new Church at Woodhall Spa, Lincoln, has been erected at a cost of about £3,700 from designs by Mr. C. Hodgson Fowler, of Durham, the contractors being Messrs Bowman, of Stamford. The reredos and pulpit are by Messrs. Harry Hems & Sons, of Exeter.

A new Museum at Linthorpe, Middlesbrough, has been presented to the town by Mr. A. J. Dorman, of the well-known firm of Dorman, Long & Co. It has been erected (at a cost of £12,000) in memory of one of Mr. Dorman's sons who fell in the Boer War.

Harrod's Stores: Quick Building Work.—On April 30th last Harrod's Stores acquired an extensive business block adjoining their premises in Brompton Road. Within twenty-four days the whole area of 11,500 sq. ft. was cleared of its old buildings; a new basement was dug out, necessitating the removal of 5,000 loads of earth; and an entirely new structure erected and handed over complete in every particular. Four days later—all within one month—the new annexe was thrown open to the public as an integral part of the stores. The various contractors employed their own men on their own conditions, paying them extra for overtime and night work. To all the foremen engaged on the work, no matter by whom employed, Harrod's themselves paid a bonus on each section being finished to time.

Oxford Ladies' Architectural Society.—About forty members of this society recently paid a visit to Burford.

Cardiff Town Hall will be completed early next year, probably in February. Messrs. Lanchester, Stewart & Rickards are the architects.

The new Drive and Promenade at Scarborough, around the base of the Castle Hill, will be ready next summer. King Edward will perform the opening ceremony.

Town Hall, Sutton Coldfield.—The architects of this building are Messrs. Mayston & Eddison, of 7, Great James Street, Bedford Row, W.C., not the borough surveyor, Mr. W. A. H. Clarry, as given above the list of tenders on p. xviii. of our issue for June 29th.

Restoration at York Minster.—As a memorial to Queen Victoria in York Minster, the reredos in the Ladye Chapel is to be restored, and the three niches filled with groups of figures. The work has been placed in the hands of Mr. G. F. Bodley, R.A.

Competition for new Schools at Middlesbrough.—In a local competition for new schools at Middlesbrough the design submitted by Mr. A. Forrester, architect and surveyor, of Middlesbrough, in conjunction with Mr. Fred Wiley, architect, of West Hartlepool, has been placed first by the assessor, Mr. Woods, of the firm of Oliver, Leeson & Woods, architects, Newcastle. Eleven sets of designs were submitted. The school is on the central hall plan, one storey high, and will accommodate 600 children.

Palestine Exploration Fund.—About £2,000 is required to complete the excavations at Gezer, now in progress under the control of Mr. Macalister.

Mr. E. B. I'Anson is the architect of the new building at St. Bartholomew's Hospital, the foundation-stone of which was laid by His Majesty the King on Wednesday last.

Cottage Homes at Cheltenham.—Two cottages have now been added to the ten built in Naunton Park, Cheltenham, during the lifetimes of the generous donors, the late Mr. and Mrs. Hay, and the homes may now be considered as complete. The two cottages have been built according to the original plan of Mr. Joseph Hall, as adapted to meet the trustees' requirements by Messrs. Healing & Overbury, his successors in practice. The contractors were Messrs. Billings & Sons, Ltd.

Whitgift Hospital Saved for a Time.—After a debate lasting several hours the Croydon Town Council have decided, by an overwhelming majority, to postpone for six months the High Street improvement scheme, which included the demolition of the Whitgift Hospital. It now seems probable that the building will be left untouched at least for some years. The projected scheme of removing the hospital in order to widen the adjoining streets and the provision of new almshouses elsewhere would necessitate an expenditure of £85,000, whilst an alternative plan, by which other properties would be set back and the hospital allowed to remain, would have cost £100,000.



The Shambles, York.

ARCHITECTS' PIANOFORTES.

THE historic firm of Messrs. John Broadwood & Sons, Ltd., recently removed from Great Pulteney Street, Soho, to new premises in Conduit Street, New Bond Street, London, W. The firm's new home was formerly Limmer's Hotel, and extensive alterations have been carried out according to the designs of Mr. Henry Tanner, junr., A.R.I.B.A.

A dignified entrance has been made in Conduit Street, from which opens a finely appointed reception and waiting-room, panelled in mahogany and furnished with furniture of the Sheraton and Queen Anne periods from the old Broadwood House in Great Pulteney Street. Passing through the reception-room immediately on the right are the offices of the secretary and the managing director, whilst to the left is an electric passenger lift running to every floor. Facing the reception-room is the "King's Room," in which were held the dinners for which Limmer's Hotel was so celebrated. This apartment has been transformed into a fine hall, decorated in the later Georgian style, the lighting coming from a dome. One special feature of the ground floor consists of the arrangements which have been made for the receipt and delivery of grand and upright pianofortes. At the extreme end of the premises in George Street is a large goods entrance to two van-docks, where the motor and other vans of the firm can be speedily loaded or unloaded. Only a step away from the loading platform is the electric goods lift, by which pianofortes of all sizes can be conveyed to any floor in a few seconds.

On the first floor are an extensive range of showrooms for grand pianofortes, the board room of the company and offices of the cashier, accountant, advertising and other departments.

On the second and third floors are other extensive ranges of pianoforte showrooms, with the tuning offices and other apartments in the rear of the building. On the fourth floor are a number of practising and other rooms. The whole building has also been entirely remodelled in accordance with the requirements of the London County Council and its Fire Brigade. A new fireproof staircase has been provided by which, in case of fire, speedy exit from any part of the building may be made. By this staircase also access to the roof is given.

For many years John Broadwood & Sons have occupied the foremost position as makers of artistic and decorated pianofortes. Many people in buying a piano give little thought as to the place it should occupy, or the detail it will become in the arrangement of the decoration of the room for which it is intended. But Messrs. Broadwood have recognized the place it should occupy in a given scheme of colour or period of furniture. One of their most remarkable decorated instruments was that made for Sir L. Alma Tadema, R.A. This pianoforte was designed by Mr. G. E. Fox, architect, for a room in the Byzantine style. In its construction the usual form of Broadwood's grand pianos has been preserved, but the supports are of more substantial and of a truly architectural character; the columns being alternately of rosewood and ebony, while the instrument case and cover is of oak.

Two years later saw the completion of the pianoforte designed by the late Sir Edward Burne-Jones. It is interesting to note that the artist was the first to see the artistic possibilities of a reversion to the old harpsichord shape, with the proportions of which it was found that the Broadwood instruments—almost alone amongst those of modern types—were peculiarly harmonious. In carrying out this idea, Sir Edward Burne-Jones did away with the orthodox three legs, and

substituted a harpsichord tressel stand. The small end of the piano tapers in an acute angle (with which angle the internal iron-work was made to conform) instead of being curved; and there is a rectangular instead of a rounded lid to the key-board. Rectangular also is the lattice-work of the music desk.

A very beautiful pianoforte, too, was made for Mr. Athelstan Riley from the designs of Mr. T. G. Jackson, R.A. It stands on pillar instead of ordinary legs. The most novel feature, however, is the introduction of a pair of carved scrolls, facing each other, forming, as it were, the two haunches of an arch bearing the ponderous body of the instrument.

Recognizing the importance of the architect in the planning of rooms, the firm made the notable step of enlisting the services of prominent members of the architectural profession.

First, perhaps, in interest amongst these examples of the modern architects' treatment of the pianoforte is the drawing-room steel barless open-frame grand which gained the Grand Prix at the Paris Exhibition. The design, by Mr. E. L. Lutyens, shows great originality. It is in the Jacobean style, carried out in oak. Thirteen slender legs take the place of the usual three substantial ones; the curved side has been replaced by straight pieces joined at obtuse angles; and the under-framing connecting the legs is chiefly semi-circular, contrasting effectively with the straightness and angularity of the body of the instrument. A good feature is the fact of the key-board being directly supported by the legs instead of jutting out from the body of the instrument in the usual way. The treatment of the pedals is noteworthy; the conventional lyre has disappeared, and the two upright steel rods which control the action are frankly exposed to view—the customary but useless third being omitted.

Mr. Arthur C. Blomfield has designed a concert grand in Spanish mahogany, inlaid with satin wood and other light woods. The style is Georgian and the body is supported by three pairs of legs connected by stretchers.

The pianoforte made from the designs of Mr. C. R. Ashbee, the well-known architect and founder of the Essex House Press, is rectangular in shape. Mr. Ashbee wanted an instrument resembling a table in appearance, and in carrying out his wishes Messrs. Broadwood have not wasted the extra space available. It has been utilized by providing an additional expanse of sounding board, and additional ironwork, which, with the barless steel construction, strengthens the frame without passing over the wires, and by allowing a wider space between the bass strings. The exterior of the piano is of unpolished oak, ornamented with heavy hammered iron hinges. Instead of being hinged at the bass side the top is divided and raised in front and back, the tone being reflected directly on to the pianist. The demand for novelty and greater beauty in the upright pianoforte was not lost sight of either. Mr. M. H. Baillie Scott has designed one on the model of an old strong box of the Elizabethan period. The doors which enclose the upper part of the instrument serve a distinctly useful purpose by acting as an additional sounding-board, and thus improving the tone of the instrument. The key-board, instead of projecting like an excrescence from the main body of the piano, is incorporated in the case. Another good innovation is the substitution for the usual flimsy music-rack of a shelf with a sloping back, extending the whole length of the piano. Oak is the wood used. An upright pianoforte designed by Mr. Gilbert Ogilvy is very similar to Mr. Baillie Scott's in that he also selects an old chest as his model. Several other eminent architects are responsible for other designs executed by Messrs. Broadwood.

Builders' Notes.

The Isolation Hospital, Clacton-on-Sea, is being warmed and ventilated by means of Shorland's patent Manchester stoves and special inlet ventilators, supplied by Messrs. Shorland & Brother, of Manchester.

Messrs. J. H. Sankey & Son, Ltd., of Essex Wharf, Canning Town, E., have just issued a new illustrated catalogue comprising the three sections respectively devoted to bricks, cements, &c., fireclay goods, &c., and sanitary goods, &c.

Sunderland's New Bridge.—The Town Clerk of Sunderland has received a letter from the directors of the North Eastern Railway Co. stating that steps are now being taken for the inviting of tenders for the proposed railway and general traffic bridge across the River Wear between Southwick and Deptford.

The British Uralite Co's Competition.—Owing to the large number of drawings sent in for this competition the judges have not been able to award the prizes so early as they expected, but as soon as a decision has been reached the names of the successful competitors will be published in the columns of this paper.

Folkestone Harbour Extension Works.—Yesterday the French Ambassador laid the last stone of the Folkestone Harbour extension works, which, begun in 1896, have been carried out by the South-Eastern and Chatham Railway Co. at a cost of £500,000. The works comprise the virtual reconstruction of the pier, no fewer than six new landing stages being provided thereon, the rebuilding of two railway stations and the construction above them of an overhead promenade for sightseers who desire to watch the arrival or the departure of the boats.

Sheffield Building Trade Dispute Settled.—The dispute between the operative stonemasons and the master-builders of Sheffield, after lasting for about six weeks, has now been settled. On the two main issues—the question of permitting the introduction of hand-worked or machine-moulded stone in Sheffield, and the binding as apprentices of stonemasons' sons—compromises have been effected between the contending parties. With regard to the former, the original rule governing the trade locally was that "piecework and sub-contracting shall not be allowed, and no worked stone shall come into the town, except flags, steps and landings." The master-builders wished to amend this so as to read, "piecework and sub-contracting shall not be allowed, and no hand-worked or machine-moulded stone shall come into the town, except flags, steps and landings." The compromise now arrived at decides that no worked or partly-worked stone shall be introduced, beyond stone planed up to the square and chamfered coping, except flags, steps and landings. With regard to the employment of apprentices, the old regulation insisted on boys being bound at the end of three months' employment, but the sons of members of the Operative Stonemasons' Society were exempt from this rule. The master-builders sought to place these on the same level as other lads entering the trade. The difficulty has now been got over by a regulation which provides that the sons of stonemasons "may" be bound, thus leaving the matter for individual settlement between the master-builders and operative masons whose sons work with them. Of the minor questions of the dispute, the master-builders desire that in winter the stonemasons shall commence work at 8 a.m., having previously had breakfast: this has been acceded to by the stonemasons. This brings them into line with other branches of the building trade. The extra ½d. per hour paid to stone-setters, or fixers, which the employers objected to, will remain as before.

Complete List of Contracs Open.

DATE OF DELIVERY	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
July 14	Kingston-on-Thames—Additions to Electricity Works	Corporation	Borough Surveyor's Office, Clattern House, Kingston-on-Thames.
" 14	Fulham—Operating-Room	Guardians	A. S. Snell, 22 Southampton Buildings, Chancery Lane, W.C.
" 14	Wimbledon—Extension to Boiler-house	Urban District Council	Engineer's Office, Broadway, Wimbledon.
" 14	Antrim—Twenty Cottages	Rural District Council	J. Clark, Union Offices, Antrim.
" 14	Bagnall—Hospital Works	North Staffordshire Joint Small-Pox Hospital Board.	E. Jones, 10 Albion Street, Hanley, Staffs.
" 14	Bridlington—Screens, &c.	Corporation	Borough Surveyor, Town Hall, Bridlington.
" 14	Bristol—Culvert, &c.	Estates and General Purposes Committee.	T. H. Yabbicom, 63 Queen Square, Bristol.
" 14	Ferndale, Wales—Church, &c.	Rev. D. Davies	E. M. Bruce-Vaughan Architect, Cardiff.
" 14	Hastings—Repairs to Infirmary	Guardians	A. W. Jeffrey & Son, 5 Havelock Road, Hastings.
" 14	London, S.E.—Demolition of Houses	Lambeth Borough Council	H. Edwards, 346 Kennington Road, S.E.
" 14	Nantwich—Schools	Primitive Methodist Chapel	C. E. Devonport, Engineer, Nantwich.
" 14	Uppermill—Walls, &c.	Saddleworth U.D.C.	J. H. Reynolds, Surveyor, Uppermill.
" 15	Middle Rasen, Lincs—Additions to Schools	Education Committee	Scorer & Gamble, Architects, Bank Street Chambers, Lincoln.
" 15	Cardiff—Restoration of Premises	T. Jones & Co.	R. & S. Williams, Architects, Wharton Street, Cardiff.
" 15	Craig-y-fedw, near Abertridwr, Wales—Thirty Houses	Craig Building Club	G. L. Watkins, Architect, Station Terrace, Caerphilly.
" 15	Thirsk, Yorks—Boiler-house, &c.	Guardians	T. Stokes, Architect, Thirsk, Yorks.
" 15	Weybourne, Norfolk—Coastguard Buildings	Admiralty	Director of Works Dept., Admiralty, Northumberland Avenue, W.C.
" 15	Leeds—Extending Abutments, &c.	Works and Ways Committee	City Engineer's Office, Leeds.
" 15	Nottingham—Stables, &c.	Instruction Sub-Committee	A. Brown, Engineer, Guildhall, Nottingham.
" 15	Stockport—Extension of Technical School	Parish Council	Technical School, Stockport.
" 15	Edinburgh—Extension of Firewood Factory, &c.	Corporation	— Ferrier, Clerk, Parish Council Chambers, Castle Terrace, Edinburgh.
" 16	Wakefield—Free Library Buildings	Corporation	Cox, Trimnell & Davison, 4 Adam Street, Adelphi, W.C.
" 16	Bridlington—Pews, &c.	—	Verger, Priory Church, Bridlington.
" 16	Hamilton, Scotland—Chimney Stack	District Committee	W. L. Douglass, Engineer, District Offices, Hamilton.
" 16	Norwich—Additions to Schools	Education Committee	A. F. Scott, 24 Castle Meadow, Norwich.
" 16	Plymouth—Wall	—	G. Gidley & Son, 17 Saltash Street, Plymouth.
" 16	Sutton Mandeville, near Salisbury—Repairs to Rectory	—	A. T. Love, Hinton St. George, Somerset.
" 16	Bridgend—Reconstruction of Market Buildings	The Earl of Dunraven	H. Martin & Son, 27 Paradise Street, Birmingham.
" 16	Halifax—Shop, &c.	Guardians	C. F. L. Horsfall & Son, Lord Street Chambers, Halifax.
" 16	Whitchurch, Salop—Alterations and Additions to Union	Governors of the Cheltenham Grammar School.	W. Webb, Architect, Bargate, Whitchurch.
" 16	Cheltenham—Science and Art Buildings	—	H. W. Chatters, 17 Regent Street, Cheltenham.
" 17	Camberley—Council Offices	Frimley U.D.C.	Surveyor to the Council, High Street, Camberley.
" 18	Bradford—Alteration, &c., to Premises	Education Committee	E. E. P. Edwards, Whitaker Buildings, Brewery Street, Bradford.
" 18	Cardiff—Extension of Premises	T. Stevens	J. W. Rodger, 14 High Street, Cardiff.
" 18	Haddenham, Isle of Ely—Wall	Education Committee	R. S. W. Perkins, County Surveyor, Ely.
" 18	London, E.—Housebreaking	Poplar Borough Council	H. Heckford, Council Offices, High Street, Poplar.
" 18	Darfield—Police-Station	Standing Joint Committee	J. W. Edwards, County Architect, Wakefield.
" 18	Chudleigh, Devon—House	F. B. Lord	S. Segar, 24 & 26 Union Street, Newton Abbot.
" 19	Hayes, Middlesex—Shed, &c.	Great Western Railway Co.	Engineer, Paddington Station, W.
" 19	London, E.C.—Convenience	Streets Committee of the Corporation.	Engineer, Public Health Department, Guildhall, E.C.
" 19	London, S.E.—Alterations to Infirmary	Lambeth Board of Guardians	W. Thurnall, Clerk, Brook Street, Kennington Road, S.E.
" 19	Newquay, Cornwall—Goods Shed, &c.	Great Western Railway Co.	Engineer, Plymouth Station, Great Western Railway.
" 19	Reading—Erection of a Stores, &c.	Great Western Railway Co.	Engineer, Paddington Station, W.
" 19	Wivenhoe, Essex—Improvements at School	Education Committee	T. Ashworth, Clerk, 57 North Hill, Colchester.
" 20	Sutton—Alterations, &c., to Asylum	Metropolitan Asylums Board	Metropolitan Asylums Board, Embankment E.C.
" 20	Altrincham—Swimming Bath	Urban District Council	Council Offices, Town Hall, Altrincham.
" 21	Mitcham, Surrey—Pavilion, &c.	Croydon R.D.S.	R. Masters, Union Bank Chambers, Croydon.
" 21	Salford—Alterations to Houses	County Council	Borough Engineer's Office, Town Hall, Salford.
" 21	Chelmsford—Improvements to Shire Hall	Industrial Co-operative Society	F. Whitmore, Duke Street, Chelmsford.
" 22	Berwick-on-Tweed—Alterations to Property	—	W. Gray, 2 Ivy Place, Berwick-on-Tweed.
" 22	Rio-de-Janeiro—Theatre	—	Commercial Intell. Branch, Board of Trade, 50 Parliament St., S.W.
" 23	Stafford—Schools	Stafford Council Schools	H. T. Sandry, 22 Greengate, Stafford.
" 25	Stockport—Town Hall, &c.	Corporation	R. Hyde, 16 St. Peter's Square, Stockport.
" 25	Treorchy, Wales—Chapel	Ramah Welsh Congregational Church.	T. Skym, 187 Bute Street, Treorchy.
" 28	Kingston-upon-Hull—Town Hall Extension, &c.	Corporation	City Treasurer, Town Hall, Hull.
" 29	Tewkesbury—Science and Art Buildings	Governors of the Tewkesbury Grammar School.	W. Ridler, Borough Surveyor, Tewkesbury.
" 30	Letterkenny, Ireland—College	Rev. Dr. O'Donnell	T. F. M'Namara, 50 Dawson Street, Dublin.
Aug. 2	Welwyn—Completion of Well, &c.	Rural District Council	R. E. Middleton, 17 Victoria Street, S.W.
ENGINEERING:			
July 15	Bristol—Plant	Electrical Committee	H. F. Proctor, Electrical Engineer, Temple Back, Bristol.
" 18	Cleethorpe—Extension to Pier, &c.	Gr. Central Railway Co.	R. St. George Moore, 17 Victoria Street, Westminster.
" 18	Reeddale—Steam Alternators, &c.	Corporation	Lacey, Saltar & Leigh, 2 Queen Anne's Gate, Westminster.
" 18	Trowbridge—Gas-Producing Plant, &c.	Urban District Council	W. H. Stanley, Market House Chambers, Trowbridge.
" 18	Alexandria, Egypt—Remodelling Lock Gates	—	Inspector of Irrigation, 3rd Circle, Alexandria.
" 18	Aston Manor, Birmingham—Pipework, &c.	Corporation	T. J. Ballard, Electricity Works, Chester Street, Aston Manor.
" 18	Hapton, near Burnley—Reservoir, &c.	Rural District Council	J. Diggle & Son, Engineers, Hind Hill Street, Heywood.
" 18	Settle, Yorks—Reservoir, &c.	Cork Harbour Commissioners	T. A. Foxcroft, Town Hall, Settle, Yorks.
" 19	Cork—Engine and Boiler	Societe National des Chemins de Fer Vicinaux.	J. Price, 9 and 10 Lapp's Quay, Cork.
" 19	Brussels—Railway	—	Societe des Chemins de Fer Vicinaux, 14 Rue de la Science, Bruxelles.
" 19	Dartford—Main Extensions	Urban District Council	W. Kay, Clerk, Council Offices, Dartford.
" 19	London, S.W.—Reconstructing Bridges	London C.C.	M. Fitzmaurice, Council Hall, Spring Gardens, S.W.
" 20	Ferry Fryston, near Castleford—Bridge	North-Eastern Railway Co.	W. G. Cudworth, North-Eastern Railway Co., York.
" 20	Spezia—Harbour Improvements	—	Ministry of Public Works, Rome.
" 21	Plymouth—Electric-Light Installation	Education Authority	H. J. Snell, 11 The Crescent, Plymouth.
" 22	West Bromwich, Staffs—Iron and Steel Work	C. Akrell & Co.	T. D. Neal, 127 Edmund Street, Birmingham.
" 22	Monmouth—Water Works	St. Mellons R.D.C.	T. Rees, Corn Exchange Chambers, Newport, Mon.
" 22	Belfast—Caisson	Belfast Harbour Commissioners	W. A. Currie, Harbour Office, Belfast.
" 25	Bristol—Hydraulic Machinery	Docks Committee	W. W. Squire, Engineer, Cumberland Road, Bristol.
" 25	Boharm, Scotland—Bridge	Banffshire County Council	R. Davidson, Road Surveyor, Dufruiwn.
" 25	Sandbach—Waterworks	Urban District Council	A. E. Stringer, Clerk to the Council, Sandbach.
" 30	Thurso, Scotland—Harbour Extension	Scarabster Harbour Trustees	J. Barron, 216 Union Street, Aberdeen.
Aug. 1	Shanghai, China—Electric Tramways	Municipal Council	J. Pook & Co., 63 Leadenhall Street, London, E.C.
" 1	Pardubitz, Austria-Hungary—Water Works	—	Burgermeisteramt, Pardubitz, Bohemia.
" 3	Calcutta—Water-Meter Testing Apparatus	Corporation	Engineer to the Corporation, 2 Municipal Office Street, Calcutta.
" 3	Sofia—Electric Lighting and Tramways	—	Commercial Intelligence Branch, Board of Trade, 73 Basinghall Street, London, E.C.
IRON AND STEEL:			
July 15	Leeds—Steel Box Girders	—	City Engineer's Office, Leeds.
" 18	Wokington—Pipes	Corporation	W. L. Eaglesfield, Borough Engineer, Wokington.
" 19	Cork—Cates	Harbour Commissioners	Engineer's Office, 9 and 10 Lapp's Quay, Cork.
" 20	Glasgow—Railway Wagons	Corporation	J. G. Monro, Town Clerk, City Chambers, Glasgow.
Aug. 18	Rio-de-Janeiro—Fishplates, &c.	Central Railway of Brazil	Central Railway of Brazil, Rio-de Janeiro.
PAINTING AND PLUMBING:			
July 14	Bristol—Painting, &c.	Education Committee	Education Offices, Bristol.
" 14	Hackney—Painting and Decorating	Borough Council	N. Scorgie, Engineer, Town Hall, Hackney, N.E.
" 14	Cardiff—Painting	School Board	School Board Offices, Howard Gardens, Cardiff.
" 14	Jarrow—Painting, &c.	Education Committee	H. M. Adam, Higher Grade School, Jarrow.
" 14	London, N.E.—Painting and Decorating	Hackney Borough Council	N. Scorgie, Engineer, Town Hall, Hackney.
" 15	Portsmouth—Painting	Radical Hall and Club Co., Ltd.	Steward, Portsmouth Radical Hall and Club, Co., Ltd., Portsmouth.
" 16	Upton, Chester—Painting	Committee of Visitors of the Asylum.	H. Beswick, Architect, Newgate Street, Chester.
" 18	Hastings—Painting, &c.	Education Committee	C. A. Pigott, Saxon Chambers, London Road, St. Leonards.

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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, July 20th, 1904.





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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

July 20, 1904. Vol. 20, No. 493.

6, Great New Street, Fetter Lane, E.C.

Summary.

A protest against the assessor's award in the recent competition for a new elementary school at Kingston-on-Thames has been made by the competing architects. (Page 34.)

A party-wall award under the London Building Act needs to be stamped, the value of the stamp varying from 6d. to 25s., according to the amount of the award. (Page 37.)

The aqueduct supplying Birmingham with water from Wales consists of $13\frac{1}{2}$ miles of tunnel, 23 miles of cut-and-cover conduit and 37 miles of pipe syphon. The total cost of the work will be about £6,000,000. (Page 35.)

A new railway bridge weighing 420 tons was recently put in place of an old one at Bow within the short space of eleven hours. (Page 38.)

Despite Mr. Gomme's statement on behalf of the London County Council, it now appears that the fine old lamp standards removed from Waterloo Bridge have not been destroyed, sixteen of the eighteen being perfectly sound. (Page 34.)

It has been referred to the Improvements and Highways Committees of the London County Council to consider a proposal for removing Charing Cross railway station to the other side of the river, taking down Hungerford Bridge, and erecting in its place a road bridge wide enough for a double line of tramway. (This page.)

At the temporary hospital, Tooting, constructed in 1893 to cope with an outbreak of fever, fire-resisting works have been carried out at a cost of £10,200, all the walls being covered with plaster and Uralite. (Page 34.)

Mr. Walter L. Spiers, brother of Mr. R. Phenè Spiers, has been appointed curator of the Soane Museum. (This page.)

Builders and others are invited to send samples of wood to be treated by the Powell or sugar process. (Page 38.)

The firm of Wimperis & Arber is now Elms & Jupp, Mr. E. F. M. Elms having taken Mr. Sydney Jupp into partnership. (Page 34.)

In a paper on the supervision of buildings, Mr. C. F. Innocent advises visits at all times and any time as the best to keep everyone on the *qui vive*. When the architect is sighted the word is passed round and by the time he has climbed on the scaffold the bricklayers, who have been laying the bricks nearly dry except on the face joints, are laying them as carefully as eggs, and the masons who have been packing their walls with little stones without a scrap of mortar to cover them, have flushed them all up in what seems a most satisfactory manner—until you poke into it. (Page 26.)

Shutters and Blinds.

At this time of the year we become painfully aware of the fact that inside blinds are of very little use for keeping a room cool. The sun pours down on the glass and the heat is radiated through the blind, making the room like an oven. Maybe the sun is not seen in our cities so often as we should like, but it is certain that when the dog days are upon us we feel its power all the more, and we then long for shade and cool. That the inside blind does not give us such relief needs no emphasis, and it is therefore surprising that shutters or outside blinds are not more often provided in places where they are very much needed. Doubtless the feeling is that the hot days do not last long enough, and that we can be pretty sure of rain after a short spell of fine weather, and hence it is thought the provision of shutters or outside blinds would be an extravagance. Nevertheless the comfort they afford well repays the expense. And here we may remark that there seems to be an opening for someone who will put on the market a neatly-constructed shutter which can be easily removed from its place when the summer is over—a shutter constructed in a light fashion with neat fastenings for attachment to the window frame or elsewhere.

A New Bridge at Charing Cross.

A GIGANTIC scheme is involved in the proposal of the London County Council to acquire Charing Cross Bridge and rebuild it, as may be judged from the following resolutions passed at last week's meeting: "That, having regard to the necessity for providing additional traffic facilities in London, and to the importance of linking up the Council's northern and southern tramway systems, it be referred to the Improvements Committee to consult the Highways Committee and to report at an early date—(1) Whether the South-Eastern and Chatham and Dover Railway Company are contemplating the rebuilding of Charing Cross Station and the widening of Hungerford Bridge. (2) Whether the Council can be advised to take the opportunity of submitting to Parliament a scheme for the acquisition by the Council of Charing Cross Station and Hungerford Bridge, providing the railway company with a site for a new terminus station on the Waterloo side of the river in place of the present terminus at Charing Cross, and erecting for general traffic a new road-bridge of sufficient width and capacity to take a double line of tramway in the centre of the roadway, so that the Council's northern and southern tramways from Aldwych to Waterloo could be linked together. (3) What saving of capital

moneys might be anticipated in carrying out such a scheme by the avoidance of the rebuilding of Lambeth Bridge and of the widening of Waterloo Bridge, and in other ways, and what would be the general result to London of throwing open such an exceptionally fine access between the northern and southern parts of the county. (4) What would be the estimated gross cost of each principal portion of the scheme, the estimated recoupment by disposal of the surplus land, and the estimated nett cost." It will be generally admitted that Charing Cross Bridge is, perhaps, the ugliest over the Thames, so that the proposal to replace it with a structure worthy of the site should find favour in every quarter. To architects and engineers the opportunity would be a great one, offering a monumental treatment of a bridge in connection (presumably) with some great building, for it is not likely that the Council would have anything else in view, and we strongly suspect the long-talked-of County Hall may be intended for the site. As regards that, however, we must wait. The railway company have not yet given their answer, much less have the Council enumerated their plans. We would suggest that, in the case of the road bridge being built, the footways should be covered, as in wet weather—not unknown in London—this would prove an inestimable benefit to the thousands who cross the river every day. The width of the Thames is remarkable: it takes five minutes to walk across Waterloo Bridge, and in driving rain the experience is not a little trying. Moreover the covered footways would offer a fresh treatment which might be made extremely effective.

Soane Museum Curatorship.

MR. WALTER LEWIS SPIERS has been appointed curator of Sir John Soane's Museum in succession to the late Mr. G. H. Birch. Mr. Spiers, who is the younger brother of Mr. R. Phenè Spiers, has been an associate of the R.I.B.A. since 1874, having passed the Voluntary Architectural Examination in the class of proficiency in 1870, and is District Surveyor for Charlton, Lee and Kidbrooke. His election to the curatorship of the Soane Museum will necessitate the resignation of the position he holds, one of the conditions imposed being that the person appointed to the curatorship shall relinquish private practice. As we mentioned in our last week's issue, Mr. Spiers had a considerable advantage over the other candidates from the fact of his having acted as temporary curator during Mr. Birch's absence abroad in the spring of the year; so that he was known to the trustees, whereas most of the other candidates were not.

NOTES ON THE SUPERVISION OF BUILDINGS.*

By C. F. INNOCENT.

IN this paper I have tried to express my views as to the general conduct of a young architect on a building, embodying such information as would have been useful to me a dozen years ago.

First, let me urge upon pupils the importance of getting on to work in progress as much as possible, as this is the way to obtain a practical knowledge of construction. If your principals would allow you to visit a building from commencement to completion, say, every day or every alternate day—to act, that is, somewhat as clerk of the works—you would be greatly benefited.

The Foreman.

The person with whom you will have most to do is the foreman, and it is well for you to remember that he is placed in his position by the builder to look after his (the builder's) interests. Much useful information can be learned in conversation with an experienced foreman, and also with the better class of workmen, such as the joiners who are "staircase hands" and the masons who set the ashlar. If you should be appointed, as I have advised, to look after work, the foreman will soon take your measure; and if he thinks you are a likely fellow for it, will try to persuade you to alter all sorts of things—of course to improve the work: such, for instance, as the benefit to be derived from the substitution of lias-lime for cement in concrete; and if you are green enough he may make such substitutions without saying anything to you about them. Things will go more smoothly if you always stick pleasantly and firmly to your first decision; if you know that you are right, take no notice of the builder's objections that such-and-such ways are unnecessary fads and that Mr. So-and-so always has it done in some other way; you will find it best to show at the beginning that you mean to have everything done well. And whilst on the subject of foremen I would remark that some builders have an inconvenient habit of moving their foremen about from job to job; this will cause you a great deal of trouble and should be objected to.

Condemning Materials.

In condemning materials you will of course order them to be removed from the site, and if you are wise you will see them go; unless this is done it is very easy for an unheeding workman to use up the stuff—of course quite by accident. If you do not see the goods removed you should at any rate remember their appearance thoroughly, and if possible plainly mark them as disapproved.

I believe that some undesirable builders consider that disapproved material is removed if placed on another part of the site: beware of this. Then again, when the builder assures you that the materials are the best, he may be correct in the letter but wrong in the spirit, as "best" used as a trade term does not always bear its recognized dictionary meaning. The "best" in some materials may be of quite medium quality.

Surprise Visits.

In work out of town, where the builder is unable to drop into the architect's office whenever he wants to ask a question, it is almost a necessity to adopt a regular day for inspection or to inform the builder beforehand of your visit; and I believe that some architects adopt this practice with their work in town: but in such cases it is of questionable utility, as it always enables the builder to have everything on the work ready for your inspection as he wishes you to see it, and there is the disadvantage of

allowing the large force of men whom he has put on the work to gladden your heart on your visit of inspection to be transferred to another job when you are safely out of the way for a few days or so. Visits at all times and any time are the best to keep everyone on the *qui vive*. You know that as soon as the labourer who is mixing mortar or loading up bricks in the road sees you bearing down on the job he goes inside and shouts up to the scaffold that So-and-so, whatever your name or your nickname may be, is coming; then the word is passed round, and by the time you have climbed upon the scaffold the bricklayers, who have been laying the bricks nearly dry except on the face joints, are laying them as carefully as eggs, and the masons who have been packing their walls with little stones without a scrap of mortar to cover them, have flushed them all up in what seems a most satisfactory manner—until you poke into it. I suppose it is natural for everyone to go the easiest way, and you will have an early example of this when the stripped soil on the site has to be tipped; you will find most excellent reasons produced for wheeling it downhill.

Personal Supervision.

When you pay a visit to a building for the purposes of supervision it is as well to go round by yourself and not be led round by a talkative foreman; in such a case I sometimes feel that work is being smothered up on another part of the building while he is engaging me in conversation; of course, it is a different matter if you go to learn what you can from him, as suggested before, and I may say here that it will be as well to ascertain from your principal what is your standing on the work. No doubt you will realize that the condemnation of work or materials by an inexperienced pupil sometimes places the architect in such a position that it is necessary to let the pupil down.

Little Peculiarities of the Workmen.

It is obviously impossible for me to describe here the numerous probable defects in the various works and materials. This has already been done in such standard works as Seddon's "Builders' Work and the Building Trades" and "Notes on Building Construction"; and various excellent articles have been published in the architectural papers. There is one point, however, which I consider does not receive adequate consideration in the text-books, that is, the correct order in which the different trades and operations follow each other. These are well known by the builder, but he does not always act up to his knowledge, considering his own convenience; sometimes, if permitted to do so, for instance, he may build the walls in one part of a building before those in another part, with unequal settlement as a possible result, or he may rush the concrete floors on while a shower of sawdust is descending from the joiners working at the roof, thus weakening the concrete; or the joiner may bridge or strut the joists as soon as they are fixed, so that the fastenings are strained with each swelling and shrinking of the timber; or a labourer with nothing to do may be set to sweep up the rubbish while the painters are varnishing, thus producing a fine frosted effect without extra charge; or various works may be delayed perhaps in the hope of slipping them altogether. On contract work each tradesman usually wishes to change his men about as little as possible, to keep them at regular work, and to go straight forward and get as much work finished as is possible at one time.

I will now run through such other matters in the work requiring your attention as occur to me.

Checking Measurements.

As to the commencement, some architects set out the work themselves, and others refuse to do so, but check the dimensions after the builder has set out; this is necessary

because you will understand what a saving an unscrupulous builder would effect if he were to pinch $2\frac{1}{2}$ in. or 2 in. from each dimension of each room. The rooms should also be tested to see whether they are square. Whether the walls are at right angles may be easily tested with the measuring tape if you remember that the sides of a right-angled triangle are in the proportion of 3, 4 and 5, and their multiples of course. The heights of the rooms should also be tested.

Footings.

You are not likely to be troubled much in Sheffield with bad foundations, though here and there are quicksands, in which cases the pump and concrete are a necessity. We have, however, plenty of clay in Sheffield, and as it is liable to swell when wet and contract when dry, with unpleasant effects to the building, you should have the footings ready before rain gets to the work. If the footings are of rubble it is necessary to see that they are well bedded on the foundations and well compacted together. Poor footings lead to subsequent cracks in the superstructure.

While speaking of the foundations I would remind you that they are occasionally omitted in places where the building inspector can be squared or where he has not yet put in an appearance.

Drains.

When the drains are laid the labourers very often start to ram the filling as soon as the first portion is thrown in, with cracked pipes as a possible result; this should not be allowed. It should also be seen that pipes are clear inside, especially from cement ridges. In places where there is much filling, water from a hose may be used with advantage to supplement the rammer.

Mortar and Concrete.

The mortar is a most important ingredient in a building, and as the builder naturally dislikes to waste any, the spare mortar a day or two old is very often re-worked up and used in the work; as, however, its setting powers are then impaired this is not satisfactory, and you should watch and prevent it. Good mortar ought to feel greasy between the fingers and dry limey on them. A builder's rough test for mortar is to take some up on a shovel and turn the shovel over; if it runs off easily he considers that it is of good quality, and *vice versa*. In practice, poor mortar which works stiff (by reason of the too great proportion of sand) is wetted to make it work more easily, and it is then deceptive; the waller finds mortar with poor sand (that is, loamy and clayey) most easy to work with. The lime used for mortar should be in lumps which ring when struck together. If it is soft or fallen to powder it has probably been rained upon or slaked by the moisture in the atmosphere, and should not be used for mortar.

In mixtures where lime or cement is an ingredient there is a tendency, owing to the greater proportionate cost of these materials, to put in a less quantity than specified, and whether you have doubts or not it is advisable to personally watch over the mixing—especially of concrete, where the strength may be of importance; the proportion of cement may be reduced under your very eyes by the labourers putting the box for measuring the cement on to the heap of stones and sand and knocking it down, thus forcing some of the stones up into the measuring box and reducing the amount of cement. Mortar should not be allowed to set too fast (or rather to dry) and in hot weather the bricks should be well soaked in water; such wet bricks are heavier and handier to the bricklayer than dry bricks. Concrete is also not improved (but the reverse) by drying, as may take place with floors in windy weather, so that it should be kept damp until it has set. You will of course see that the bricks are properly,

* Extracts from a paper read before the Sheffield Society of Architects and Surveyors.

bonded, especially at angles, in reveals and jambs, and in piers. A well-bonded brick wall is much more satisfactory in appearance than one in which the joints are not perpendicular and the bricks cut about; in this respect the old eighteenth-century brickwork, where the piers and openings are all multiples of a brick, is superior to much modern work, where the piers and openings are set out on a drawing to a scale of feet and inches and the bricks have to be cut to fit.

Flues.

In the walling of flues, a matter which needs careful attention is not to "choke" them, because this is one of the most usual causes of smoky chimneys; particular attention should be paid to the flues at the bends to see that they are kept large enough; as the necessary bends themselves impede the smoke, you should see that the men in walling do not make them smaller at the angles, as they have a habit of doing.

Inferior workmen are very careless about keeping woodwork or steel joists properly away from flues and fireplaces; many fires have been caused by this, and you must carefully guard against it. There are still builders in this district who lay the joists, then build the flues around them as they come, afterwards cutting off the pieces of joists which run across the flues, leaving the ends of the joists exposed.

The defective filling-in of the backs of stoves, and the careless springing of the flues, are other frequent causes of fires and should be avoided.

Mason Work.

You will have learnt that stone should be laid in the work upon its natural bedding plane or "quarry bed." Many of the building stones used locally are somewhat micaceous sandstones in which the tiny white mica spangles are bedded parallel to the plane of deposit, *i.e.*, the "quarry bed"; if this is not possible, a good way of ascertaining the bed of a stone is to douse it with water. The beds worked by the mason require your attention to see that they are level and of full size, otherwise pieces may flush. It is rather expensive and troublesome sometimes for a builder to replace a piece of ashlar which has got chipped or otherwise damaged, and it is possible for him to patch it up very neatly and inconspicuously with cement; and I understand that very up-to-date masons stick the chip on with shellac and sand the joint, all with unfortunate results later. Keep your eyes open for this.

Scaffolding.

Some inferior builders, in order to save scaffolding on the work, only put it up on one side of the wall; this necessitates what is known as walling "overhand" and should be objected to, as it is almost impossible to plumb up the work properly; of course in some cases this one-sided walling is necessary. You should regularly plumb the walls, as those out of plumb are unsightly and may be unsafe; besides, the joiner and the plasterer cannot make a good job with them. Another point to attend to in walling is to see that the scaffolding is raised in easy stages for the wallers; some men neglect this, to the detriment of the walls. These are little ways in which the builder may effect savings that keep money in his pocket and add of course to his balance on the right side. Similar things occur in all trades—in the carpenter's, for instance, as giving all the bearing timbers an inch or so less of bearing at each end, or by making the roofs of a flatter pitch than shown on the drawings (which is easy in a hipped roof), or by setting the joists of wood or steel an inch wider apart than taken, or by systematically omitting one joist in each room; such omissions all add up.

Extras.

The ordering of extras is important, and I must warn you to be careful of what you

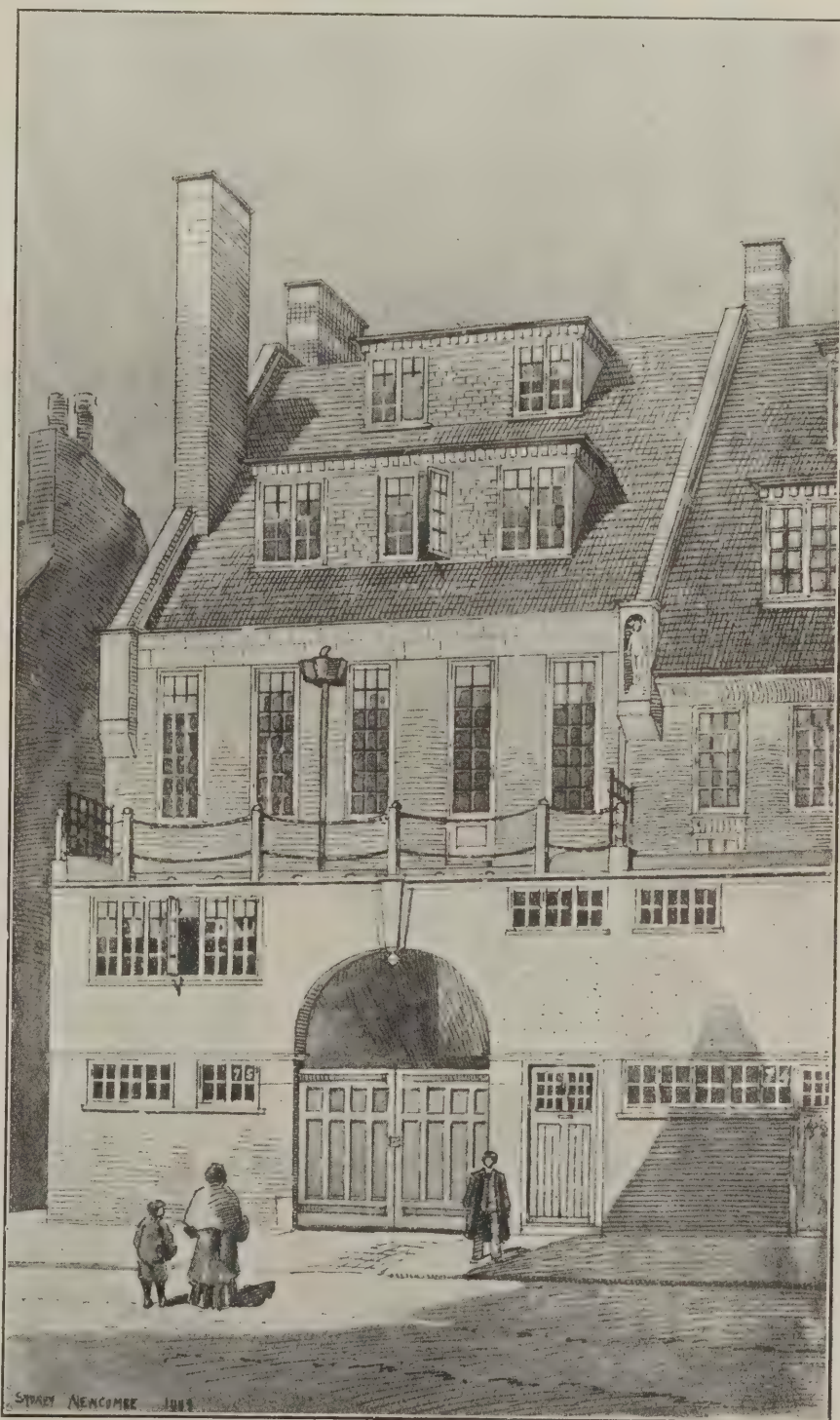
say, as builders sometimes put their own interpretations on your innocent expressions of opinion, and when the bills come in and your principal asks the builder who ordered such-and-such an extra, the builder, looking in his pocket-book, says, "Oh, your Mr. So-and-so ordered it on such a date"; and the results may be unpleasant for everybody. It is best for the builder to understand that the architect alone can order extras.

Workshop Knowledge.

I have previously pointed out the importance of seeing work carried out, and I would here emphasize the importance of getting round the builder's shops in addition to the building itself, as without a good acquaintance with workshop practice you will hardly be able to draw workable details. I have seen sections drawn for local sandstone which could only be worked in wood, or perhaps in marble, and every builder has

tales of impossible details that come out of architects' offices. Not only are such visits to shops desirable for the acquisition of knowledge but they are necessary in the case of joinery, as the first coat of paint, known as the priming coat, is usually put on in the joiner's shop, and all kinds of defects may be covered up if not seen before being painted.

The principal points to notice in the joiner's work at the shop are the quality of the timber (especially as to sap and seasoning), bad joints, and the omission of labour, as in grooving and rebating, and to see that the framing is square and not winding on its faces; also, if detail drawings have been used, to see that the work as regards mouldings, framings, panels, &c., has been carried out in accordance with them. The quality of timber gets poorer as the years go by and as the old forests around the Baltic are cut



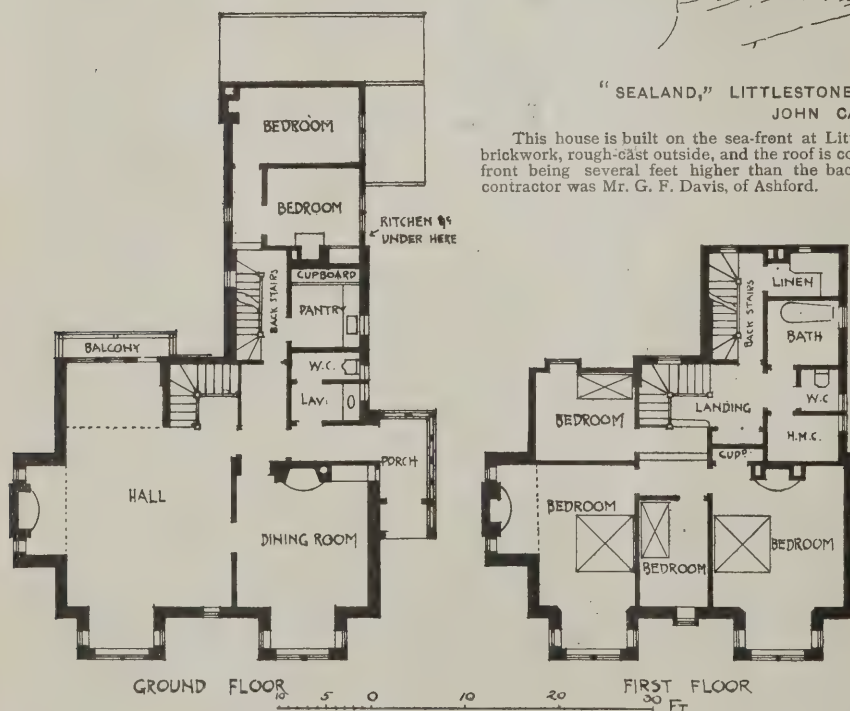
(Royal Academy Exhibition, 1904.) See p. 35.

75, CHEYNE WALK, CHELSEA. C. R. ASHBEE, ARCHITECT.



"SEALAND," LITTLESTONE-ON-SEA, FOR HENRY N. GLADSTONE, ESQ.
JOHN CASH, F.R.I.B.A., ARCHITECT.

This house is built on the sea-front at Littlestone, Kent, the back overlooking the golf links. The walls are of brickwork, rough-cast outside, and the roof is covered with old local plain tiles. Owing to the nature of the site, the front being several feet higher than the back, kitchen and servants' rooms are below the ground floor. The contractor was Mr. G. F. Davis, of Ashford.



down. Much of the inferior stuff, with its large annual rings, quickly grown in a crowd, and therefore soft, which is now sent over, is no doubt inevitable, but it hardly justifies the sweeping statements of some joiners that there is no good wood to be had nowadays: they may be reminded that there is as good fish in the sea as ever came out, if they care to buy it.

Possibilities in the Roof.

The places where things are most likely to be forgotten (as I will put it) are those which are dark and difficult of access, more especially the roof. I would urge you to

climb up and see whether the spars and purlins and the other timbers are all properly spiked together. A client usually notices things which, though structurally unimportant, render, if not rightly built, the "very very pretty house" desired by some people unobtainable, and they should be carefully attended to—such as the quality of paint and varnish, the centering of fireplaces and windows in walls, the fitting of window sashes, and the squareness of joiner's work, irregularity in which interferes with the correct fitting of wallpaper patterns. In setting out, joiners work up to eighths of

inches but consider $\frac{1}{8}$ in. infinitesimal. Bricklayers and masons do not expect to take into consideration less fractions than half inches.

Slates.

The roof coverings require careful watching. Slates from the better-class quarries have not been very easy to get lately, and unless you early bestir yourself you may be driven to accept inferior slates. Of course you will understand that with materials which have to be obtained some time before they are used in the building there is sometimes a likelihood of the builder using them for other jobs before yours is ready for them, and this may prove awkward. If the slates are to be to sample, it is as well to make sure that they are so; this, of course, applies to all other materials to sample, especially the bricks and the joiner's ironmongery.

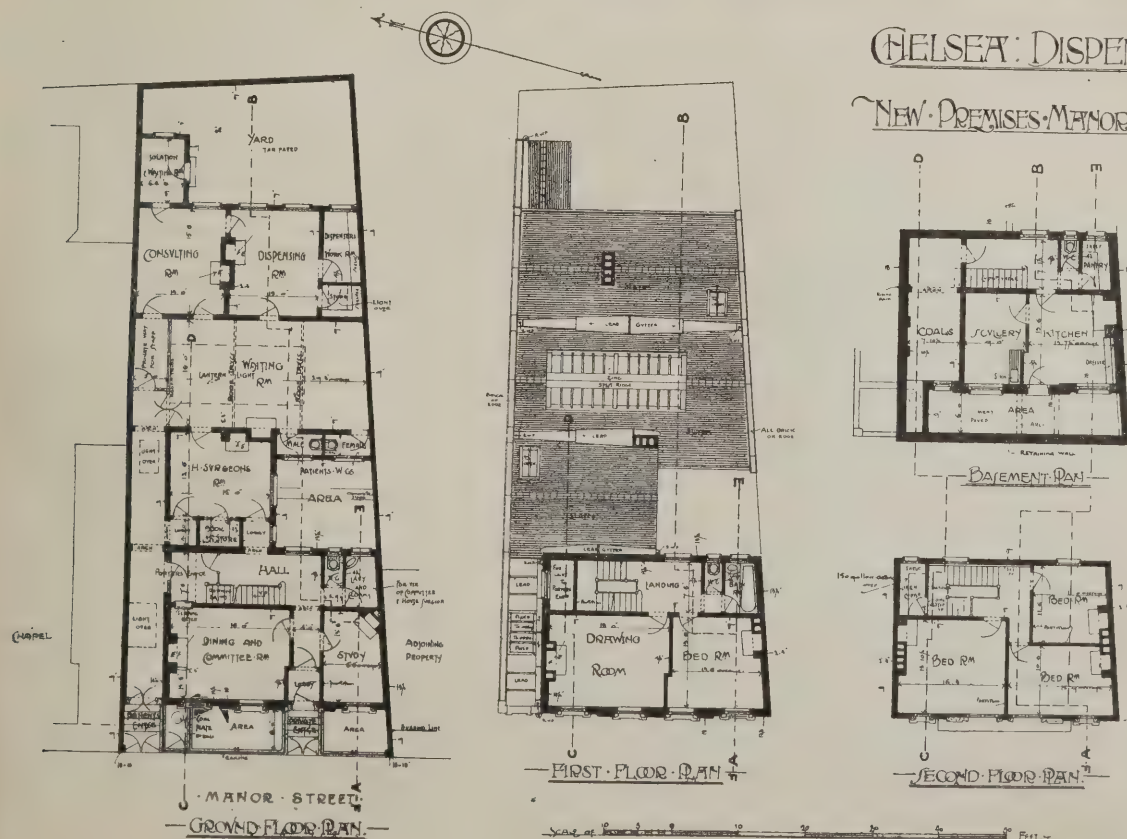
As the slating is only a small trade I propose to consider it more completely than the others, as a type of the supervision required for all trades. The first thing to look to is the quality of the slates; they should be both hard and tough, they should have a metallic ring when struck with the knuckles, and should not fracture easily when lightly struck against wood; if water poured on the slate is soon absorbed, the slate is of course porous; slates with friable and splintered edges are generally bad; slates with green blotches in them (though the blotches do not affect the weathering qualities) are about £1 per ton cheaper than plain slates; slates get shaken on their railway journey, and if not properly packed a jolt

in shunting may sometimes crack them from end to end of the truck. The slater should test every slate for soundness before holing it, which he does by striking it on a bar in front of him or by sharply tapping it with a hammer; cracked slates, however slight the cracks are, should not be put on, as frost is sure to crack them completely. The holing of the slates determines the lap, and this is one of those matters where a squeeze of $\frac{1}{4}$ in. will put something in the contractor's pocket. The nail-holes should not be so large that the slate will draw over the nailhead. In holing, the slate sometimes breaks around the holes, and if not stopped the slater may turn and hole again; no slates which are broken or much chipped should be allowed. The labourer may so hole the broken slates that the broken end is hidden, when laid, by the upper slate, and there is then only one thickness of slate covering the roof at that point. The laths should be free from sap and nailed to every spar. The roofs should be lined over before lathing, and any spars which are down, or appear likely to sag, should be attended to. The slates should of course be slightly tilted towards the roof at a gable unprotected by a coping and the spars firmed out before laying; the slates if in the least uneven should be sorted into thicknesses so as not to be laid at random, and any which are twisted should be rejected, as they certainly ride, although the slater sometimes says, "Oh, they'll be all right; we put the flat side downwards." Of course the heavier (and in Westmorelands the larger) slates should be laid at the bottom. The double eaves-course is sometimes slipped, and if it is not the two bottom courses are sometimes nailed to a single lath. Nails, if expensive (such as copper nails), are another matter in regard to which the slater may try to save something. Sometimes you will find nails of two weights on the job, one as specified and the other lighter. I confess that I offer no explanation of this, and fear that you will not obtain a satisfactory answer from the slaters. The nails should bulge out somewhat in the middle to get a firm hold on the lath. The joints of the slates should



CHelsea DISPENSARY.

NEW PREMISES, MANOR ST. S.W.



This replaces the old building in Sloane Square. The materials used are red bricks with terra-cotta dressings. Messrs. Stimpson & Co., of Brompton Road, were the builders. The total cost was about £3,000.

A.W. FIELDWARD, ARCHT.
J.F. BIRKBECK, ARCHT.
21, FORD ST. ADELPHI
LONDON



HOUSE AT BRANCASTER, NORFOLK. GEORGE O. SCORER, ARCHITECT.

This house overlooks the links at Brancaster and is built of brick, rough-cast, with tile hanging and roofs. A feature in the planning is a lounge hall in the centre of the main building, with verandah. The builders were Messrs. Read & Wildbur, of King's Lynn.

be virtually over each other for the sake of appearance. Occasionally there is a tendency on the part of the slater to delay the pointing of the slates until after the ceilings are plastered, on the principle I suppose that what is out of sight is out of mind.

The pointing mortar should be haired or it will not stick to the underside of the laths, and some slaters do not put the hair unless supervised; it is also a trouble to the men to get cement-mortar specially to point the verges, and ordinary lime-mortar will be used if you are not careful. The ridge-tiles should be set and pointed in cement-mortar, and, if flanged, the flanges should be away from the south and west in order to avoid giving a purchase to the gales from those quarters. The angle inside the ridge should be less than the rake of the roof, so as to grip it more firmly.

I have already advised you to keep your eyes on the mixing of the plaster and need not say more on the subject, except that you

should satisfy yourself that the lime is well slaked. Sometimes the plasterer finds it easier to fill up a space by laths in a different direction to the rest; the plaster at such points will possibly crack, so that you should not allow him to do this. Plaster on laths should be well "keyed"; that is, squeezed between and behind the laths. I have had it explained to me by a plasterer where the key on some stoothing was absent that a key on lathed upright partitions was as unnecessary as on walls, there being no pull from the plaster, as on ceilings; but that plasterer did not make a convert, and I name the incident as an example of the numerous good reasons for doing bad work which are constantly being brought forward. It is surprising how monotonously sap and other defects in laths are declared to be "only a little stain." Of course in some cases what at first looks like sap proves to be only surface dirt.

You will find a source of considerable

trouble and annoyance in the independence of some trades and the ignorance of some workmen. I refer to such matters as the cutting of bearing timbers by plumbers and gasfitters and their kind, who, unless you warn them beforehand, will chop right through your bearing timbers without compunction, if it suits them to run their pipes in such ways.

The Plumber and the Painter.

The plumber is such a monster in the popular imagination that you will be pleased to find him, on the whole, neither better nor worse than his fellow-tradesmen. However, should he be so inclined, his opportunities for taking advantage of you are many, especially in the lead in gutters, flashings, &c., which should of course always be tested for size, lap, weight and fall, as all of these are liable to be skimped. Also, the plumber is able when cutting the lead to give a twist with his knife which thickens the edge, so that it is better not to rely on the lead gauge but to weigh a bit of the lead and calculate the weight therefrom. The eaves-gutters and down-pipes should also be inspected for correct and even thickness.

The painter's trade is one of the most difficult for the architect to exercise supervision over the materials. I recommend you to make a study of these. It is well to have each coat of paint of a different shade; of course the variation need only be slight, but if you see each shade on everywhere you know that all the coats are on. This refers more especially to the constructional steel-work, where a coat is often slipped.

We have all heard of people who could not open a single window when they went into their new building and could not get the architect to attend to it for three days. Therefore, before the client occupies your building I advise you to go round and see that the sashes are not stuck with paint, that the window-fasteners work properly, that none of the keys are missing, that any damaged slates are repaired, that the eaves-gutters are clear of rubbish, and (not least in importance) that the w.c. cisterns are in working order. These little things, if left imperfect, make a new building unpleasant for its occupiers and may lead to accusations of neglect on the part of the architect.

My notes must here end. But I must not conclude without saying that they do not apply to the better class of builders, with whom I hope that you will only have to deal. And as a final word of advice let me say, do not fall off the scaffold.



This house is treated externally with buff-tinted rough-cast, roofs finished with heather thatch and cherry-red bricks to plinths and chimney tops. The ground floor is fitted up in oak, chiefly to the ceiling beams, staircase and screen, and ingle-nooks. The upper floors comprise six bedrooms, bathrooms, &c. two of the six bedrooms being in the roof. The joinery throughout is treated in the simplest manner with the idea of getting an almost "square-edged" effect. The principal features are the spacious verandah and the large balcony to the first-floor best bedrooms. The house was designed by Mr. H. Courtney Constantine and Mr. H. Alexander Cox of 5, Mount Park Road, Ealing.

Views and Reviews.

The Sanitary Condition of Liverpool.

This reprint of a series of articles which appeared in the "Liverpool Journal of Commerce" sets forth the author's indictment of the Corporation for not securing the good sanitation of the city, the basis of the many charges being the present high death-rate of Liverpool. We cannot say that Mr. Shallcross has enough important matter to warrant twenty-five articles; rather we feel that his charges are too diffused, and we must at once observe that most of them, concerning food and milk supply, hardly call for notice in these columns. Article 8 enumerates the chief matters of direct interest to our readers, and the following may be chosen as indicating the author's views:—(1) On the one hand, tons of drinking water used to flush the sewers (when water from the sea would better serve the purpose); on the other hand, in order to effect an injudicious saving of water, adequate sanitary flushing cisterns neither demanded nor even permitted. (4) On the one hand, costly 'demolition area' schemes; on the other hand, open country permitted to be over-congested with buildings. (5) On the one hand, costly schemes for creating and laying-out open spaces; on the other hand, existing open spaces permitted to be built upon. (6) On the one hand, elaborate administrative machinery for the disposal of refuse; on the other hand, pollution of streets and atmosphere in the process of its removal (*i.e.*, uncovered vans). (8) On the one hand, costly scavenging of the principal, wide and non-residential streets; on the other hand, less frequent scavenging of subsidiary and narrower residential streets and courts in the most congested areas of the city. (9) On the one hand, the magnificent and costly Vyrnwy waterworks scheme to provide pure water for the inhabitants; on the other hand, neglect to prevent contaminated water being delivered to the consumer, owing to the unsuitability or dirty condition of storage cisterns." In addition there are charges against bakehouses and kitchens, and finally the building by-laws of the city, which Mr. Shallcross (who is a Liverpool architect) characterizes as "defective, impracticable and restrictive of sound building; so much so, in fact, that the Liverpool Corporation have obtained an Act of Parliament to enable them to ignore their own building by-laws; yet, they have not altered them in the interests of the individual." The pamphlet is of course mainly of interest to residents in Liverpool, but there are doubtless other persons—more especially medical officers of health and sanitary inspectors—to whom it will appeal.

"Municipal Shortcomings," by T. Myddelton Shallcross. London: Elliot Stock, 62, Paternoster Row, price 1s. nett.

Stresses and Thrusts.

Mr. Middleton's little book on structural calculations is very popular, as may be judged from the fact that it has now reached its third edition under its present title, though in reality the fifth. It has been enlarged, the chapters on rectangular beams and arches having been entirely remodelled, and examples given; and to the chapter on struts a worked example is added, as well as tables and a section upon wooden pillars; while examples of girder design entitled "designing a steel joist" and "designing a steel-plate girder" are included. A few examination papers have also been added at the end of the volume. The book is favoured for preparation for the R.I.B.A. and Society of Architects' examinations, and so far as the ordinary elementary theoretical side is concerned is clearly written, easily understandable and useful, but the practical side is weak, and the author's examples of joist

and plate girder design are full of errors or methods which have been found inadvisable in practice. This is perhaps nothing very serious in a book of such elementary character, but we could wish that it were designed to give a more serious preparation for practical designing. The chapter on roof-trusses is very poor, especially as regards wind loads. The book, however, has its use in instructing elementary students in graphic methods, and contains a number of very simple explanations where most books are wearily involved.

"Stresses and Thrusts," by G. A. T. Middleton, A.R.I.B.A. London: B. T. Batsford, 94, High Holborn, W.C., price 4s. 6d. nett.

Scaffolding.

This book deserves a hearty welcome. It is surprising that a work on so important a subject as scaffolding has not been published before. Although scaffolding is only temporarily framed structure, it cannot therefore be haphazard or risky in construction, for the safety of life and limb, emphasized by recent legislation (such as the Workmen's Compensation Act and the Factory and Workshop Act) depends upon it, no less than the efficient carrying out of the constructive work and the saving of monetary loss by damage to materials or waste of labour, which might be incurred by overloading, wind thrust, or the support of heavy materials on insecurely built scaffolding. The author has had a wide and varied experience of the subject, and his book is clearly written and essentially practical. He rightly observes that "the practice of allowing workmen to erect scaffolds without the aid of expert supervision, as is generally the case, is to be strongly deprecated. The architect, builder or clerk of works should in all cases be responsible for their erection—the risk of defective or unsafe work being thereby minimised, and an economy often effected in both labour and material." The theory of the subject has not been neglected, but the author has, perhaps wisely, not gone too deeply into the calculation of sizes of timbers, ropes, &c., because scaffolding is designed in exactly the same way as any other framed structure, and of course the conditions and materials usual and available have to be studied, Mr. Thatcher has not omitted any factor of importance to the architect or engineer who may have to undertake the design of a scaffold. The following are the headings of the chapters in the book, from which its general character may be inferred: Scaffolding, scaffolds for special purposes, shoring

and underpinning, timber, cordage and knots, scaffolding accessories and their use, the transport of material, the stability of a scaffold, the strength of a scaffold, the prevention of accidents, and legal matters affecting scaffolding. There is an appendix giving the weight of materials. The chapter on legal matters is very useful. The illustrations are clear, and the aid of photography has been sought to show actual scaffolds.

"Scaffolding: A Treatise on the design and creation of scaffolds, ganties and stagings," by A. G. H. Thatcher, building surveyor. London: B. T. Batsford, 94, High Holborn, W.C., price 5s. nett.

Correspondence.

The Tomb of Nicholas Hawksmoor.

To the Editor of THE BUILDERS' JOURNAL.
THORNTON HEATH.

SIR,—On July 12th I paid a visit to the tomb of Nicholas Hawksmoor in the churchyard of St. Botolph, Shenleybury, about 2½ miles from Radlett Station. The tomb is beneath a large and very old yew tree and consists of a flat stone slab 5in. thick, resting on a base of red brickwork about 1ft. high. The slab, somewhat green, is cracked in half below the inscription, which is now only just decipherable; the brickwork is decayed, and ground-ivy is gradually creeping up it. The inscription is as follows:—

P. M. S.

L

Hic Jacit

NICHOLAUS HAWKSMOOR Arin' (?)
ARCHITECTUS

Obijt vicesimo quinto die

Anno Domini 1730

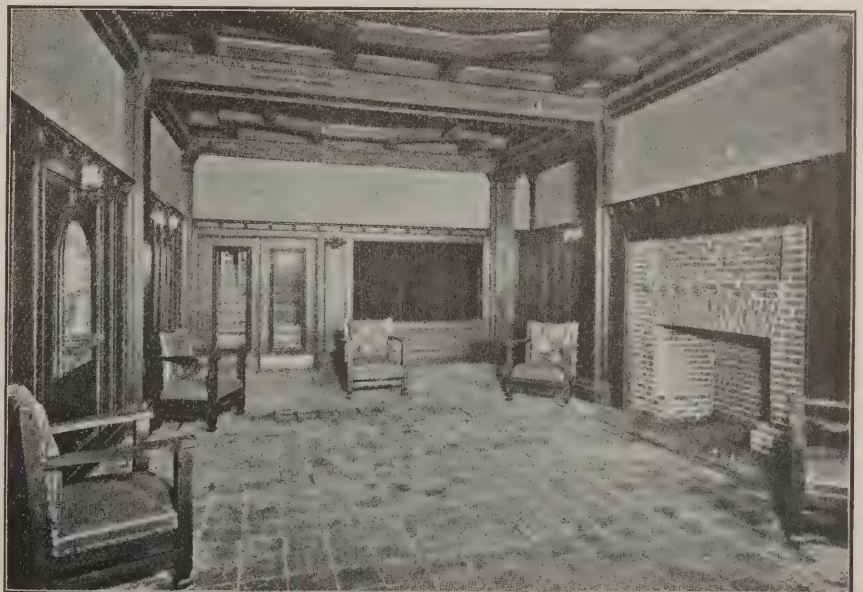
Ætatis 75

But for the protection afforded by the branches of the old yew tree it is quite possible that the inscription would have become illegible long ago.—Yours truly,

EDWARD CROSBY.

Obituary.

Mr. W. H. Rawle, architect, of Manchester, forty-nine years of age, was found dead recently in a house at Moss Side, where he resided, having apparently shot himself through the head with a revolver, which lay by his side. It was stated at the inquest that the deceased had been disappointed owing to some professional work he had not received. A verdict of "Suicide whilst insane" was returned by the jury.



SMOKING-ROOM, NEW LYCEUM THEATRE, 149, WEST 45TH STREET, NEW YORK.
HERTS AND TALLANT. ARCHITECTS.

FAILURES OF GAS AND OIL ENGINES.

By M. POWIS BALE, M.I.C.E., M.I.M.E.

Author of "A Handbook for Steam Users," "Gas and Oil Engine Management," &c.

OWING to their many advantages gas and oil engines have come very largely into use during recent years, but notwithstanding that they have reached a considerable degree of perfection, both in design and construction, users find they are still more or less subject to breakdowns.

The chief causes of failure may be set down as follows:—

- (1) Bad design or construction of the engine.
- (2) Improper mixture of gas and air.
- (3) Defective water circulation or insufficient cooling of the cylinder.
- (4) Leakage of the piston.
- (5) Leakage of the valves or valve joints.
- (6) Improper or insufficient lubrication.
- (7) Governor gear defective.
- (8) Ignition valve, tube or gas-supply defective.
- (9) Back-pressure from fouling the exhaust with residue or water.
- (10) Ignition apparatus worn or defective.
- (11) Imperfect compression or combustion.
- (12) Air in gas-supply pipe, increased or decreased pressure of gas, &c.
- (13) Point of ignition wrong.
- (14) Hot bearings.
- (15) Driving at too short centres.

Improper Mixture of Gas and Air.

The effective and correct mixing and proportions of gas and air is a matter of great importance in the economical working of the engine. No hard-and-fast rule as to the exact proportions can be laid down, as it all depends on the calorific value or richness of the gas used. As regards the proportions of gas and air, given a good average town gas about 10 volumes of air to 1 of gas may be taken as a standard. Producer gas, on the other hand, usually requires slightly more air than its own volume for its combustion.

Insufficient Cooling of the Cylinder.

The circulating tanks should be capable of holding about 70 gals. per brake-horse-power; the connecting pipe should be of ample capacity, and must be kept free from incrustation.

Leakage of the Piston.

If there is a leakage by the piston a wheezing and knocking sound is often heard, and the gas consumption is largely increased. This trouble may arise from badly fitted or worn piston rings, the cylinder scored from insufficient or improper lubrication, or worn oval or out of truth, or over-heated from insufficient cooling. If the cylinder is worn there is no remedy but re-boring.

If loss of compression is suspected the charge should be compressed by turning the fly-wheel backwards; should there be little or no resistance it may be concluded something is wrong.

High compression combined with complete combustion and expansion are most important factors in economical working.

Leakage of the Valves or Joints.

This is of common occurrence, and may be due to the valve seat being worn, the valve being hung up from dirt, or the valve spring being too weak. These defects are a fruitful cause of faulty compressions, explosions, &c., the charge escaping during compression through the leaky valve into the exhaust pipe, so that when the charge in the cylinder is fired it communicates with and explodes the gas and air in the exhaust. If the inlet valve leaks, the unexploded charge when compressed will be forced back in the air pipe,

and the next charge will be nearly all gas instead of a mixture of gas and air; consequently, should it burn at all, very little power is given off. This leakage will give a strong smell of gas and a yellow-red exploding flame. If the exhaust valve spring has become too weak the proper proportions of gas and air are altered, and a series of mis-fires results. All valve faces must be kept true and clean so as to allow them to close effectively. If they are dirty or damaged a thumping noise will be heard.

Improper or Insufficient Lubrication.

It is the reverse of economical to use a poor oil for lubricating purposes, and it is found in practical working that the very best oil, carefully used, is by far the cheapest. Many good oils are now prepared, especially for cylinder lubrication. What is required is a neutral oil or grease that will not readily develop free or fatty acids under the action of heat, or vaporize readily, or form much deposit. A mineral oil is usually employed to which a slight proportion of vegetable or animal oil (or both) is added.

Although vegetable oil readily carbonizes at high temperatures, it has a tendency to fill up the grooves between the piston and cylinder walls and make them more airtight. Animal oil, on the other hand, although liable to form fatty acids, improves the lubricating power of the mixture and does not deposit much carbon.

If an unsuitable oil has been used, and the piston is withdrawn, it will be found with a thick, rusty-coloured mass of deposit, which often sets hard and consumes a large amount of power, at the same time damaging the cylinder and piston rings. A good cylinder oil usually leaves a slight blue-grey deposit. A heavily loaded engine will require an increased amount of lubrication. Gumming usually arises from overheating, from bad circulation or insufficiency of the cooling water, insufficient lubrication or bad or improper oil. Too much lubrication is also bad, as in addition to wasting the oil it often finds its way into the air-passages, &c., and clogs the admission and exhaust valves. Oil should not be employed to lubricate the ignition or exhaust valve; fine plumbago is often used for this purpose. If the cylinder is allowed to get dry there is little doubt an explosive dust is created, sometimes causing premature ignition; improper or low flash lubricants will often have the same effect.

If too much oil is being supplied to the cylinder it can usually be detected by a smoky exhaust, which may, however, arise also from imperfect combustion of the charge.

If the engine is working properly the exhaust should be almost colourless, or with a slight blue haze.

The oil used should be of the highest flash-point obtainable, as the heat in the cylinder—unlike that in a steam-engine—is very dry and intense.

Defects in Governor Gear.

Defects can generally be detected by the intermittent or sluggish action of the governor gear in regulating the engine. To secure steady running the governor should be sensitive and kept in first-class order, and when the joints or gear show signs of wear they should be attended to at once. The lubrication should receive careful attention and an oil should be used that is not liable to gum.

Ignition Valve or Gas-Supply Defective.

Should the ignition valve become rusted or hung up, a hissing sound is usually given out by the igniter during compression, the ignition flame is drawn in, and an increased noise is heard in the exhaust. If the gas-pressure is increased and the charge becomes too rich in gas a black smoke is seen in the exhaust and the ignition flame increases. The fitting of an anti-fluctuator will obviate this latter.

Back-Pressure from Fouling of the Exhaust.

Considerable loss of power may arise from this cause and remain undetected, especially when the pipes are small or where there are bends in them. If there is much accumulation of water it may run back through the exhaust valve into the cylinder, ignition port, &c., and cause considerable trouble. A water cock should in all cases be fitted to the exhaust, and opened periodically, more particularly during very cold weather, when condensation is largely increased. Instead of short, sharp pulsations, with a fouled exhaust, they will be long-drawn-out and irregular, and the cylinder will be dirty and smoky.

Ignition Apparatus Defective.

If the ignition apparatus is allowed to get worn and defective a late ignition of the charge usually takes place, resulting in loss of power and producing a loud noise in the cylinder and exhaust.

If the ignition valve is not tight the jet may be blown out through increased pressure after mis-fires.

Imperfect Compression or Combustion.

Imperfect compression arises from worn cylinder or piston rings, overheated cylinder, and leaky or dirty valves; while imperfect combustion arises from improper mixtures, or insufficient mixing of the gas and air, incorrect firing or imperfect compression.

Mis-fires, Back-firing, &c.

These usually arise from a weak mixture of gas and air, valves out of order, improper size or length of tube, or tube not hot enough, &c. The overloading of an engine also has a tendency to produce mis-fires. "Back-firing" is due to a leaky exhaust valve or a mis-fire, the unburnt mixture being carried into the exhaust pipe and subsequently fired by the flame of the next explosion. Back-firing may also be caused by not opening the gas-supply far enough, thus producing a weak mixture, which burns slowly and fires the next charge, which rushes into the exhaust with a loud report.

With late ignition or back-firing there is an incomplete combustion of the charge; consequently there is a higher pressure in the exhaust, and power is lost; at the same time increased strain is put on the exhaust-valve gear and the valve itself becomes heated.

Back-firing is more frequent with gas of a low ignition temperature.

A "scavenger" stroke, which allows cool air to pass through the engine every cycle, has a tendency to prevent back-firing and pre-ignitions.

Explosions in Air Pipe.

These usually arise from shortness of gas; a weak charge being fired smoulders in the combustion chamber and exhaust, and mixing with the gas in the next suction stroke explodes it. A further loss arises from this explosion, as on the next suction stroke these partly-burnt gases enter the combustion chamber, instead of an entirely fresh supply of gas and air, and consequently retard and reduce the power of the next explosion.

Hanging-up of Valves.

This will occur if the valves are allowed to get dirty, rusty, damaged or overheated; also from a weakened valve spring or bent valve spindle.

Broken or Damaged Valves.

This sometimes happens from poor design of valves, such as too great a lift or insufficient area, weakness of neck, burning, &c. If the exhaust is throttled from too small a pipe or silencer, or from its being partially filled up with residue, back-pressure will arise and cause hammering of the valve, increasing the liability to fracture. If the exhaust valve is allowed to leak it will soon be cut out by the hot gases passing through.

Weak Valve Springs.

Should the valve springs become weak they should be at once renewed, or a loss of compression will result and the proportions of gas and air will be altered, which may cause a considerable loss in the force of the explosion. When valve springs are renewed it is of the utmost importance that they be of the same strength as the original ones, or the working of the engine will be disarranged.

Joints of Valves.

The leakage of the valve joints sometimes gives trouble and destroys the compression. To detect a slightly defective joint is sometimes not an easy matter. The usual plan is to compress a charge of air in the cylinder and try the joints with a light. If the leakage is considerable it may be heard. The joints are usually made of asbestos, and should be carefully fitted.

Point of Ignition Wrong.

If the charge in the cylinder is not fired at the correct moment the maximum effect of the explosion is not attained, and a constant and sometimes considerable loss of power may be going on.

If the ignition of the charge is too early the maximum pressure of the piston is reached before the end of the stroke, and its effect is lessened; if the charge is fired too late it has the same result, as the average pressure on the piston is reduced in proportion. To get the most powerful impulse it is generally concluded that the charge should be fully fired, and the highest pressure reached immediately at the commencement of the expansion stroke, and not on the dead centre; this at the same time avoids a dead blow on the crank pin. To obtain the highest results the moment of ignition must be adjusted to suit the charge, the compression and the speed of the engine.

Ignition Tubes.

Although electric ignition for fixed engines largely obtains on the Continent, English practice is still in favour of the employment of a heated nickel alloy, porcelain or composition tube, as these have been found tolerably certain in their action and fairly durable. They can be rapidly heated and are low in first cost. It is very important that the tube should be well and equally heated, in order to secure the greatest efficiency and avoid cracking from unequal expansion. The tube should be kept to a bright-red heat, but should not be overheated, or it may burst. The passage to the combustion chamber should be kept clean. Tubes should be renewed as soon as they appear to be defective, which will be shown by irregularity in the firing, as, although the engine may continue to work, a considerable loss of gas may be going on. The regular cleaning of tubes before lighting adds to their durability. The asbestos lining and joints should be kept in good order, for if they become worn the tube will not heat properly. The Bunsen burner should be kept clean and adjusted to give a small blue flame entirely round the tube. If the flame flies back to the holes in the burner, it is short of gas.

Pre-ignitions of the Charge.

Pre-ignitions may arise from a variety of causes, such as—

- (1) Too great a compression of charge.
- (2) Heated deposit or foreign matter in the cylinder.
- (3) Slow or incomplete combustion in the former charge, which remains sufficiently heated to fire the charge before the finish of its compression stroke.
- (4) Smouldering gases drawn from the exhaust pipe into the combustion chamber.
- (5) Overheating of the exhaust valve.
- (6) Increased gas-pressure.
- (7) The use of low-flash oils for lubricating the cylinder.
- (8) Insufficient air in the charge.

(9) In the case of electric firing from overheated ignition points, &c.

(10) Point of ignition wrong.

Knocking in the Cylinder and Engine.

Knocking in the cylinder often arises from premature firing of the charge before the end of the compression stroke is reached, thus throwing a greater pressure than usual on the piston before it commences the power stroke, and causing a jar or knock as the crank turns the dead centre.

It may also arise from late ignition, a misfire, the piston rings being loose, broken or gummed up, improper or insufficient lubrication, or from ridges or irregular wear in the cylinder. The engine may also thump from too great a supply of gas; this may be ascertained by reducing the gas-supply gradually.

In addition to defects in the cylinder, &c., knocking or pounding in the engine generally may be caused at the end of the stroke when the crank is on the dead centre, from wear on the connecting-rod bearings or from their not being keyed up tight enough. Knocking may also arise from the key of the fly-wheel becoming loose, the crank shaft or crosshead being out of line, from the axes of the journals not being parallel, or the bearings requiring adjustment or lubrication. Worn valves will also cause knocking.

Speed of the Engine and Number of Explosions.

It being important that the engine should run at its proper speed, its revolutions and the number of explosions should be tested every few weeks.

Causes of Smoke from the Cylinder.

If black smoke comes from the cylinder it may arise from (1) leaky piston, (2) overheating, (3) want of or excessive lubrication, (4) faulty ignition, (5) too rich a mixture and (6) fouled exhaust.

Engine Slowing Down.

An engine may slow down or stop from a variety of causes, such as (1) overheating of the cylinder, (2) defects in the valves, piston or joints, (3) overloading, (4) overheating of bearings, (5) defective ignition and (6) defective compression, combustion, gas-supply or exhaust.

Oil Engines.

Many of the remarks on the failures of gas engines will apply equally well to oil engines. Oil engines are usually more liable to pre-ignition than gas engines; special care should therefore be taken as to the amount of compression used, also as to ignition and water cooling arrangements.

Another fruitful cause of failure in oil engines arises from insufficient vaporization of the oil. If the oil is insufficiently vaporized, owing to the vaporizer not being hot enough, a portion of it may be carried over into the cylinder and give trouble in starting, and vapour may show itself at the air inlet, from late ignition of the charge or if the vapour valve is not tight on its seat. If too much oil is fed to the vaporizer it will render the engine more difficult to set in motion. The clogging of the oil pump, vapour valve, vaporizer or lamp will also cause disarrangement.

Oil Engines refusing to Start.

Engines will sometimes refuse to start even if they are in order. This will probably arise from too much oil in the vaporizer, improper mixture of the vapour and air, insufficient mixing, too much air, too early firing of the charge or insufficient speed to overcome compression. Should the engine slow down after starting, a little extra oil should be pumped by hand. Examine all valves and see that they act at the right moment or if dirt prevents them closing properly.

Electric Ignition for Fixed Oil Engines.

Electric igniters, being safe, are well adapted for oil engines. The point of

ignition can be readily altered and controlled, but they are rather more liable to disarrangement than a heated tube.

Failures of Electric Igniters.

Electric igniters fail from a variety of causes, such as—

- (1) Wire broken in circuit.
 - (2) Terminals too thin and overheated or at an incorrect distance apart.
 - (3) Wrong adjustment of contact breaker.
 - (4) Loose or corroded connections.
 - (5) Short-circuits between terminals or battery, &c.
 - (6) A weak or defectively-constructed battery or accumulator.
- In "jump spark" igniters, which are largely used for motor cars, from other reasons than those already given, such as—
- (7) An accumulation of carbon bridging the terminals and causing a short-circuit.
 - (8) Defective insulation of the plug, or plug damp.
 - (9) Terminals too near to ironwork of engine, &c.

(An accumulation of carbon, or partial insulation, is often caused by too much lubrication or the use of an improper oil. The plugs, &c., should be frequently cleaned.)

(10) A sparking-plug made of bad or unsuitable material is also the cause of many failures.

(11) In a magneto igniter from the magnets not being sufficiently powerful.

(12) In a dynamo igniter from defective brushes, commutator, armature, &c.

Hot Bearings.

Heated bearings may arise from a variety of causes, such as—

- (1) Bearings of insufficient area for the pressure or strain put on them.
- (2) Engine running at short centres with a tight belt.
- (3) Badly fitting or seamy shaft.
- (4) Bearings screwed up too tight.
- (5) Insufficient lubrication, improper or bad oil.
- (6) Dust or dirt in the bearings; oil grooves too shallow or oil holes stopped.
- (7) Bearings will also stretch and pinch the shaft from being allowed to run slack or to get out of line or level.
- (8) From oil boxes or lubricators being air-tight and preventing the proper flow of oil.
- (9) From the axes of all the journals not being parallel, or from the shafts not bedding evenly on the bottom of the bearings.
- (10) From the engine being overloaded.

Driving at too Short Centres.

The writer has known many cases where an engine has been blamed for not giving out sufficient power when the trouble has largely arisen through driving at too short centres and the consequent slipping of the belt.

Short centres should be rigorously avoided, as they mean tight belts, increased wear to belt and bearings, and constant trouble. The driving and driven pulleys, too, should be in proper ratio one to the other, and the bottom side of the belt by preference be the driving side.

In conclusion, to secure a constant speed and steady and economical running in gas and oil engines all the working conditions must be kept as uniform as possible. For example:—

- (1) The quantity and temperature of the cylinder jacket-cooling water discharge should not vary.
- (2) Uniformity in the quality and amount of the charge.
- (3) Uniformity in compression and ignition.
- (4) Constant and equal lubrication.
- (5) Free exhaust and uniformity of its temperature.
- (6) Sensitive and steady governing.

Keystones.

Another Fresco at the Royal Exchange was unveiled by the Lord Mayor on Monday. It has been presented by the members of the Stock Exchange and represents the conferring of the Charter on the Bank of England. Mr. G. Harcourt, of Arbroath, is the artist.

Liverpool Cathedral.—His Majesty the King laid the foundation-stone yesterday. The portion to be first completed will accommodate 3,500 persons. The whole edifice, when finished, will serve for 8,000 persons, and will be the largest cathedral in Great Britain. The fund is at present £230,000.

Messrs. Waring & Gillow have combined with the well-known contracting firm of J. G. White & Co. for the purpose of undertaking extensive building work. They at present have contracts on hand amounting to £1,500,000, including the great Ritz Hotel in Piccadilly.

Watts's Frescoes.—At the Victoria and Albert Museum, South Kensington, some interesting trial-pieces which the late Mr. G. F. Watts executed in true fresco on a suitable ground, before beginning to paint on the wall at the famous Villa Careggi, near Florence, are now on view.

A.A. Day School.—A pamphlet giving particulars of the Architectural Association Day School, session 1904-05, can be obtained on application to the secretary at 18, Tufton Street, Westminster. Mr. Maule, the master, is now assisted by Mr. H. A. Douglass and Mr. J. H. Squire, Mr. W. A. Jones having been obliged to retire owing to ill-health. We understand that this last session has been a greater success than ever.

New Libraries for Tipton.—At a special meeting of the Tipton District Council held last Wednesday it was decided to ask Mr. John Perry, of Tipton, and Mr. G. H. Wenyon, of Great Bridge, to submit designs in competition for the free library building to be erected on the park site at a total cost not exceeding £3,500, the unsuccessful competitor to be asked to prepare the designs for the library proposed to be erected at Toll End.

The new West Window of Exeter Cathedral, in memory of the late Archbishop Temple, has now been completed from designs by Mr. G. F. Bodley, R.A. The colouring is somewhat light, white glass predominating. The greatest care has been taken in restoring the window, the tracery being very little interfered with. The stonework has been carried out by Messrs. Luscombe & Sons, of Exeter, and the glasswork by Messrs. Burlison & Grylls, of London.

Partnership.—Mr. E. F. M. Elms, having purchased from the trustee in bankruptcy the share of his late partner, Mr. W. H. Arber, in the practice of architects and surveyors formerly carried on by Mr. Arber and himself in partnership under the style of "J. T. Wimperis & Arber," has arranged to take into partnership Mr. Sydney Jupp, who has been for many years identified with the business, and the practice will for the future be carried on under the style of "Elms & Jupp."

Arts and Crafts.—The annual exhibition of work executed by students of the London County Council Central School of Arts and Crafts, 316, Regent Street, W., was held last week. The exhibits showed that the instruction arranged by the principal, Mr. W. R. Lethaby, is excellent, and is doing very great service in the education of those engaged as apprentices or improvers in the higher branches of art. The architectural designs shown were rather crude and eccentric, but considering the short time the students are under training, very good results are obtained.

The new Grand Stand at Goodwood has a frontage of 253ft. and a height of 50ft., providing accommodation for 10,000 people. Mr. A. G. Henderson was the architect.

The House of the late Miss Kate Greenaway in Frognal, Hampstead, was put up to auction recently, but withdrawn. Mr. Norman Shaw designed the house.

Berwick's Ancient Wall Preserved.—The Bell Tower at Berwick-on-Tweed and the ground enclosing the remaining portion of the Edwardian wall are to be leased to the Board of Works for Scotland.

A New City Police Station has been erected in Moor Lane at a cost of about £21,000. The work has been done by Mr. Arthur Porter, of Tottenham, from the designs of Mr. A. Murray, the late City surveyor.

Storches Hall Asylum.—At last week's meeting of the West Riding County Council it was decided to accept the tender of Messrs. J. Radcliffe & Sons (£211,532) for the erection of the administrative blocks, &c., for the Storches Hall Asylum, near Huddersfield. Mr. J. Vickers Edwards is the architect.

Hunstanton Convalescent Home.—Competitive designs have been invited by the governors for a new home for children in connection with this institution, to provide for ten boys and ten girls and the necessary administration accommodation. Of the plans sent in, those by Messrs. MacAlister & Tench, of Cambridge and Norwich, have been awarded first place by the assessor, Mr. Alfred Saxon Snell, F.R.I.B.A., and have been adopted by the Governors.

A Statue of Queen Victoria at Southport was unveiled on Friday afternoon by the mayor. The site is in the Municipal Gardens, Lord Street, in front of the Atkinson Art Gallery. The statue is of bronze, and is the work of Mr. George Frampton, R.A. It represents Her Majesty standing in her robes of state, and bearing the sceptre in her right hand and the orb in her left. The pedestal is of grey granite. The cost was defrayed by public subscription.

Fire Prevention in Hospitals.—The Metropolitan Asylums Board have taken measures to render their temporary hospital at Tooting, generally known as the Fountain Hospital, as safe from fire as modern science can make it. The buildings were constructed in nine weeks in 1893 to cope with an outbreak of fever which occurred at that time, and though originally designed by Messrs. T. W. Aldwinckle & Son, merely for temporary occupation, they have stood the test of time well. The managers decided to carry out certain fire-resisting works with the double object of rendering the buildings safer from the risk of fire and of adding to their permanence—they believe, in fact, that the life of the buildings has been extended by at least twenty years. These improvements have now been completed, and the managers claim that theirs is the first hospital of this character which has been so treated. The work, which has cost £10,200, or about £25 a bed, consists in covering all the walls with fire-resisting plaster and with sheets of Uralite. All existing paint has been removed from the internal woodwork and a fresh coating provided, consisting of one coat of Bell's No. 1 fireproof (asbestos) solution, two coats of Zopissa distemper, and one coat of varnish colour. A number of guests were invited to visit the hospital last Friday, and after they had done so a demonstration of the fire-resisting properties of Uralite was given in the grounds. Two huts, one lined with Uralite and the other matchboarded with deal, were simultaneously set on fire, and at the end of half an hour the latter was a charred mass, while the Uralite hut had sustained no damage.

St. Anne's Church, Brondesbury, is being built from the designs of Mr. Cutts. The total cost will be £5,100 and the seating accommodation 500.

The Abbot's House at Arbroath, which adjoins the Abbey ruins and is one of the oldest inhabited houses in Scotland, is proposed to be put under the charge of H.M. Board of Works for Scotland.

North-Eastern Hospital.—On Wednesday last the new building at the North-Eastern Hospital for Children, Hackney Road, which has been in use since September last, was formally opened by H.R.H. Princess Louise. Mr. William C. Marshall is the architect. The hospital now contains 114 beds, this being double the number which the former limited accommodation allowed. Besides four wards the extension contains an operating theatre and a casualty room. The total cost of the scheme has been £45,000.

Kingston School Competition: Protest by Competing Architects.—We understand that seven of the nine architects who were unsuccessful in the competition for a new elementary school at Kingston-on-Thames—the other two having been disqualified—have joined in a letter to the Town Council drawing attention to the breaches of conditions committed by the author of the plans recommended by the assessor for adoption, and pointing out also certain defects in the design. The architects urge that upon these grounds the assessor's award shall be ignored and the matter referred to the president of the Royal Institute of British Architects.

The House at Great Stanmore, near Harrow, illustrated as a centre plate this week, is built of brick, finished mostly with smooth white plaster, with stone bays and dark-red tiled roofs. A feature of the plan is the gallery across the end of the hall. A double flight of steps leads up to it, the rest of the staircase being continued on the other side to the first floor. The drawing-room opens out on to the gallery, and one gets a pleasant view down the hall in descending to the dining-room. Under the gallery is a low angle-nook with wide fireplace. Another point of interest is the door opening from the servants' passage into the vestibule. Mr. Arnold Mitchell, F.R.I.B.A., is the architect.

The Leysian Mission Buildings, which have been erected in City Road at a cost of £112,000, form the most complete mission premises in the world. The architects are Messrs. Bradshaw & Gass. The Queen Victoria Hall, which is the only completed portion of the buildings, has seating accommodation for 2,000 persons. In addition there are a small hall and numerous classrooms for Sunday School work; clubrooms for men, boys, women and girls, tea and refreshment rooms, and a fine drill-hall and gymnasium. A medical mission is to be conducted in a detached building, and there are other rooms for the administrators.

The Lamp Standards on Waterloo Bridge.—The Bridges Committee of the London County Council is considering the reference made to them with regard to the removal of the lamp standards from Waterloo Bridge, and has decided to consult Mr. Frampton as to whether these standards are still fit to be used for electric-lighting purposes. It now appears that none of them are broken, sixteen out of the eighteen being perfectly sound, and the others only slightly damaged. (This statement was made by the chairman of the Bridges Committee at last week's meeting of the Council, though Mr. Gomme, the clerk, had said that the standards had been much broken and had not been preserved.) The standards are of cast-iron and were placed on the bridge in 1817.

Bricks and Mortar.

Aphorism for the Week.

Proportion in Architecture is nothing but a relation of parts conditioned by utility, materials, scale and habit.—W. R. LETHABY.

Our Plates.

No. 75, CHEYNE WALK, CHELSEA, designed by Mr. C. R.

Ashbee, is a continuation of a scheme for a block of houses comprising 72-76, Cheyne Walk. Externally it is carried out in stock bricks, with stone facings and rough-cast, the roof being covered with green Westmoreland slates and the dormers and flats with lead. The balcony at first-floor level is protected by wooden posts and iron chains, at either end being zinc-lined flower boxes and wooden trellis. The rainwater-head is in beaten lead; the carriage gates have large iron hinges and are painted dark-green; and the window frames and casements throughout are painted cream colour. Internally the drawing-room is carried out in fumed oak, with pictures (chiefly landscapes of subdued tints) framed into the panelling. In the back portion of the room the oak panelling forms a dado, the walls above being hung with canvas. The floor is of polished oak and the fireplaces are of moulded stone with iron dog-grates. The contractors were Messrs. The General Builders, Ltd.; the oak panelling, carriage gates, hinges, &c., being by the Guild of Handicraft, Essex House, Campden, Gloucester. The drawing of the drawing-room reproduced as a centre plate is hung in this year's Academy; also the drawing of the exterior reproduced on p. 27.—The six houses on the Norbury

wards the fourteenth-century chantry on the bridge was visited. Externally this must have been of wonderful richness and beauty; unfortunately the stone has weathered so badly that little more remains than a suggestion of the original effect in the part which escaped the restorer's hand early last century. Internally there is still some most interesting detail in a very rich canopy and niche, showing most delicate workmanship. The roof is also of interest.

Birmingham's Water-supply from Wales.

BIRMINGHAM'S water-supply from Wales has involved the formation of artificial lakes by damming the higher reaches of the rivers Elan and Claerwen. From the filter beds in the Elan Valley to the service reservoir at Frankley, about seven miles from Birmingham, the aqueduct has an entire length of seventy-three miles. The whole of this is now complete. It consists of 13½ miles in tunnel, twenty-three miles in cut-and-cover conduit, and thirty-seven miles in pipe syphon. This work was carried out in sections by several contractors, but the extensive work in the watershed, necessitating at one time the employment of 2,000 men, was carried out by the Corporation. It represents one of the largest direct labour undertakings carried out by any municipality. The cost of the scheme, which was engineered by Mr. James Mansergh, F.R.S., ex-president of the Institution of Civil Engineers, will be about £6,000,000.

New Power and Pumping Stations at Chelsea.

THE Junior Institution of Engineers recently paid visits to the Chelsea Generating Station of the Underground Electric Railways Co. in Lots Road, Chelsea, and to the adjoining London County Council' pumping station. The former will supply current for working the trains of the District Railway from Whitechapel to the various western and southern termini, Richmond, Wimbledon, &c.; also the tube trains of the Baker Street and Waterloo Railway, the Great Northern, Piccadilly and Brompton Railway, and the Charing Cross, Euston and Hampstead Railway. The initial equipment of these lines will be about 150 trains. The station is designed for ten units of 5,500 kilowatts each and one unit of 2,500 kilowatts. The output will be three-phase, 33½ cycles, 11,000 volts, and will be distributed at this potential to twenty-three sub-stations. The site comprises 3'67 acres and has a water frontage of 1,100ft. The building is 453ft. 6in. long by 175ft. wide, with an office annexe 25ft. by 8ft. On this basis, the square feet occupied per kilowatt, including the office building, is 1'36, and the cubic feet per kilowatt, measured from the ground level to the peak of the roofs, is 1'39. The steel frame of the building, weighing 6,000 tons, is entirely self-supporting. The foundations extend from 30ft. to 36ft. below the ground level, and the loading of the clay does not exceed 4 tons per sq. ft. The station is designed for turbine engines, and illustrates the reduction in floor area which can be secured with this type of engine as against the reciprocating type. At the L.C.C. pumping station there are four horizontal gas engines, each having two 18½in. cylinders with 2ft. stroke, both coupled to one crank (cylinders at opposite ends). On each crank shaft is a 7ft. 6in. rope pulley grooved for eight 1¼in. ropes, which ropes lead down to similar pulleys of 6ft. 5in. diameter on the four centrifugal pumps. The pumps have suction and delivery pipes 23in. diameter and impellers of 66in. diameter. The engines each indicate about 200-h.p. at about 150 revolutions per minute, and the pumps each throw about 44 tons per minute. There are also four engines having 18½in. cylinders, 2ft. 6in. stroke, 7ft. 6in. rope pulleys on crankshafts, grooved for ten 1¼in. ropes and 10ft. 4in. similar pulleys on pumps.

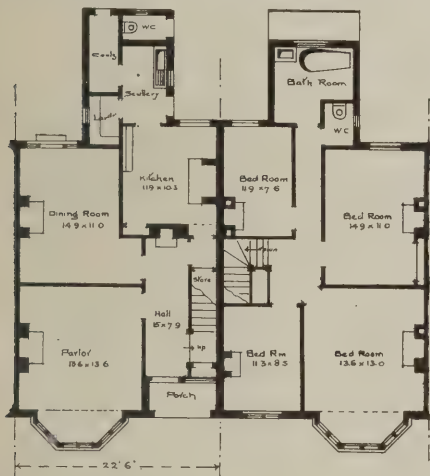
The pumps have 32in. pipes and 72in. impellers. These engines each indicate about 240-h.p. at about 160 revolutions per minute, and seven pumps each throw about 85 tons per minute. The 200-h.p. engines pump from the low-level sewer, and the other engines from the higher level Counties Creek sewer. The whole plant works only during rainy weather and pumps storm-water only into the Thames. The average number of hours per annum during which it will be required to run is estimated at sixty or seventy, though of course in exceptionally wet years it may be that the machinery will run as long as one hundred hours.

New Nautical School, Portishead.

ON Thursday last Princess Henry of Battenberg laid the foundation-stone of the new nautical school at Portishead, which is to supersede the old training-ship H.M.S. "Formidable." The architect is Mr. Edward Gabriel, of London, whose design is now exhibited at the Royal Academy. The school will be three storeys high, with a frontage of 382ft. It will be built of brickwork, finished with white rough-cast, with red brick plinth and red brick Ionic pilasters between the windows. The roof will be covered with red Bridgewater tiles. Under the tower in the central building is the main entrance, surmounted with carved figures of Neptune and Britannia. The tower is to be finished with wood and a copper fleche. The two upper floors of the school are to be used as dormitories, and from each there will be two staircases for use in case of emergency, the steps being of solid balks, which, besides being fire-resisting, are not so likely as stone to cause chilblains when trodden on by the boys' naked feet. Each large dormitory will have four officers' cabins and inspection windows for efficient supervision. The floors of the dormitories are to be of timber, tongued, and the space made to resemble the deck of a vessel as much as possible. The lads will sleep in hammocks, as on board ship. The gymnasium, which is at the rear of the central building, measures 84ft. by 50ft. From the parade-ground access is obtained by broad flights of steps to a lower terrace. The land between this and the Channel is to be laid out as playing-fields. The ground floor of the west block will be used for a mess-room, with kitchen, scullery and store-rooms adjoining. At the extreme end of the west block is to be the chief officer's house and rooms for resident schoolmaster. The ground floor of the east block is to be devoted to school-room and classrooms, library and teacher's room. At the extreme east of the building is the residence of the captain superintendent. The school will accommodate between 350 and 400 boys, and is estimated to cost £30,000.

Law Cases.

Railway Contractors' Claim for Extra Work.—The case of *Pearson & Son, Ltd., v. The Great Western Railway Co.* came before the King's Bench Division last Thursday. This was a special case stated pursuant to an order of the Court of Appeal by Sir Benjamin Baker, the arbitrator appointed under the arbitration clause in a contract between the parties, by which the contractors, the appellants, undertook for the respondents the construction of the line near Patchway. On the hearing before Sir Benjamin Baker the contractors desired the admission of evidence that they were required to construct slopes at angles at which they would not stand, that the quantities of excavation ordered by the engineer exceeded those shown by the schedule and contract drawings, and that in the case of one tunnel of 4.43yds. in length the amount of water that had to be provided for by the permanent works was ten times that



GROUND FLOOR PLAN. 1ST FLOOR PLAN. HOUSES, NORBURY MANOR ESTATE. FRANK S. CHESTERTON, ARCHT.

Manor estate are built of red bricks, with tiled roofs and the bays rough-cast and distempred. The plan is arranged to give a spacious entrance with a fireplace in the hall, two sitting-rooms, kitchen and offices, with four bedrooms, bath and w.c. on the upper floor. The frontage to each is 22ft. 6in. Mr. Frank S. Chesterton, of 51, Cheapside, is the architect. The drawing is hung up in this year's Academy.—Some particulars of the house at Great Stanmore will be found on p. 34.

Manchester Society of Architects.

ON July 9th this society visited Wakefield and spent some time in going through Messrs. Gibson & Russell's fine council offices for the West Riding County Council. The entrance hall, with beautiful marble floor and walls and plaster domical ceiling; the well designed corridors; the very notable council-chamber, seating 120 members; and, in fact, all the principal rooms—were found to be of great interest and worthy of more thorough study than time permitted. After-

shown by the drawings and specification. The question for the Court was whether on the construction of the contract the claims in question were in respect of work for which prices were fixed by the contract, and whether the claims for extra payment were admissible. —The Lord Chief Justice, in delivering judgment, said, in regard to the earthwork, the Court was of opinion that the work done was not different from that contemplated by the contract. If the work was carried out in accordance with the orders of the engineer and with the usual methods of engineering practice, the schedule prices in the contract were applicable. With regard to the excavations, a mere increase in quantity did not justify an increase beyond the schedule prices, but the latter increase might be justified if the circumstances were such that the arbitrator should come to the conclusion that the work was not fairly contemplated by the contract. With regard to the tunnelling, the mere existence of water was not of itself sufficient to enable the contractors to open up the schedule prices. But if on the evidence before the arbitrator, or in his opinion, the contract specified a particular description of tunnel, and the work done was proved to be essentially different in character and description, then the arbitrator might be justified in departing from the schedule prices. But if the works were the same as the contract contemplated the mere fact that more water was found would not justify a departure from the schedule prices.

IN PARLIAMENT.

(By our Press Gallery Representative.)

DURING the past few weeks little attention has been given by the House of Commons to any subject outside of the Licensing Bill.

General Laurie one day asked Lord Balcarras whether his attention had been called to the wooden or plaster shutters which had been placed behind the open-work of the architectural screen which connects the gateways leading into the Admiralty courtyard, Whitehall, and whether he could propose to the First Commissioner of Works to remove those shutters and allow the whole screen to be seen and appreciated. —Lord Balcarras said the wooden shutters had been in existence for many years. The First Commissioner was considering the possibility of removing them.

Mr. MacNeill, whose interests are not confined entirely to Irish affairs, asked Lord Balcarras if he would state what had become of a number of bronze lions (by Alfred Stevens) which were along the line of railings in front of the British Museum, and which were removed to widen the footway. —Lord Balcarras stated that twelve lions were removed to St. Paul's Cathedral with the concurrence of the Trustees of the British Museum. The remainder were at the Museum, in charge of the Trustees.

Mr. MacNeill also asked what had become of the handsome stone colonnade (classic pillars, monoliths) formerly in front of Burlington House, Piccadilly, and removed by the Department of Works, and why it was not re-erected in one of the parks or elsewhere; in reply to which Lord Balcarras said that the colonnade was lying in Battersea Park. The question of re-erecting it was now under the consideration of the First Commissioner.

Mr. McKenna asked the Secretary to the Treasury whether he would consider the expediency of abolishing the charges now made for the right to take photographs of Raglan Castle. —Mr. Victor Cavendish replied that neither the Treasury nor the First Commissioner of Works had any jurisdiction in the matter, as Raglan Castle was not the property of the Crown.

Last Thursday Sir Gilbert Parker asked

Lord Balcarras whether the authorities were aware that the Portland cement being used for the general post-office, Sunderland, and the general post-office, Darlington, and supplied by an English firm, was manufactured in Belgium, and whether in future orders would be given for the use of the best English cement on Government works. —Lord Balcarras asked Sir Gilbert Parker to postpone his question, which was accordingly done.

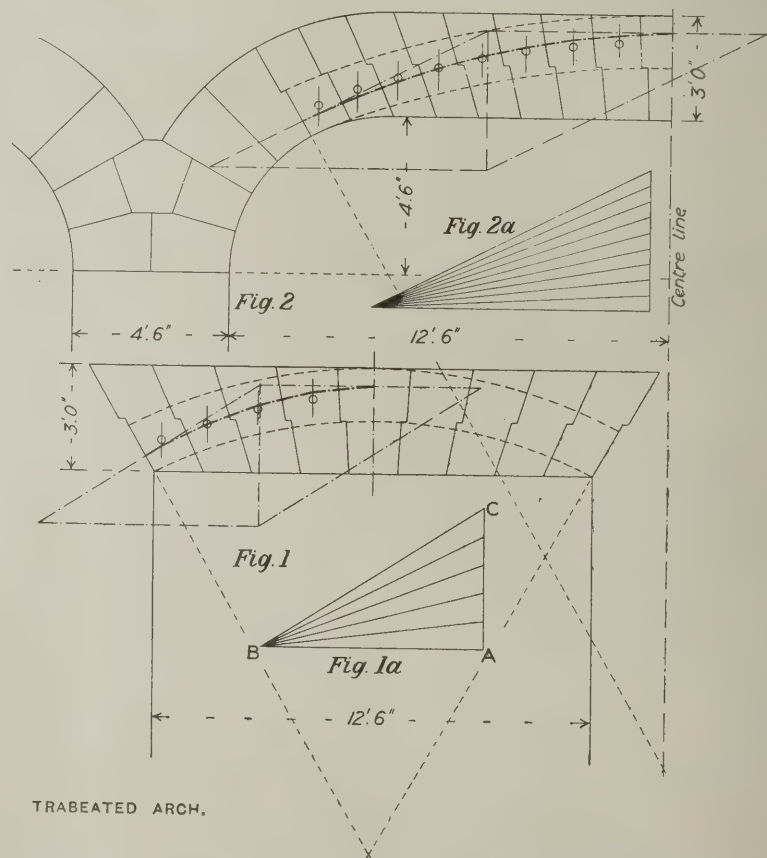
Enquiries Answered

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Trabeated Arch.

GALLATOWN. — D. F. S. writes: "What rules may be applied to determine — (1) the limit of span for a trabeated portion of a stone wall, jointed as shown by Fig. 1, to

the bottom of the middle third at the abutment; draw vertical line through centre of gravity of load on the half arch; draw horizontal thrust line to meet this vertical; and from point of intersection draw line through abutment; cut off the vertical at a length equal to amount of load on half arch, and complete parallelogram. Then the horizontal line is the thrust at the crown, and the inclined line the thrust at the abutment. In the present case, as no load is given, it is taken as unity = w , and the thrusts found are horizontal $1.575w$ and inclined $1.87w$. Now draw a horizontal line AB (Fig. 1a) equal to horizontal thrust and a vertical line AC equal to load. Divide AC into the same number of equal parts as there are voussoirs and join the points to B . Parallel to these lines and through the centres of gravity of the virtual voussoirs in dotted arch draw lines as shown; these will give the curve of thrust for the arch. As the depth of virtual arch is $1.5ft.$ and thrust per sq. ft. will be $\frac{1.575w}{1.5}$ = $1.05w$, and taking w as 1 ton per ft. run = $6.25 \times 1 = 6.25$ tons on half arch, the



carry a given weight of superstructure, the stonework to be unassisted by constructional steelwork; or assuming the span to be 25ft. and the wall 3ft. 6in. thick, what should be the height of the stones and the safe load to be carried; (2) the limit of span for arched or trabeated construction as shown by No. 2?"

An arch of the construction shown in Fig. 1 is equivalent to a straight arch or lintel, which acts as an arch only when the abutments are rigid. In such a case the virtual arch is contained within the substance of the lintel or other construction, having a depth of half the depth of lintel, the other half being equivalent to the rise. A span of 25ft. would be extravagantly in excess for this mode of construction. For an illustration of the method of working to find the stresses, an example has been taken of half this span, namely, 12ft. 6in., and a depth of 3ft. Assume the line of thrust to be at the top of the middle third at the crown, and at

thrust would be $1.05 \times 6.25 = 6.56$ tons per sq. ft. if acting on the centre of the joint. As it is on the outer edge of the middle third, the actual thrust will be double, namely, $6.56 \times 2 = 13.12$ tons per sq. ft., which would be quite enough to put upon ordinary stone unless exceptional care were taken to produce a true bearing surface over the whole joint. With the above explanation the construction of Fig. 2 will be apparent at a glance, but the joint where the short radius commences is taken as a skewback, the remainder being equivalent to a curved abutment. In this case, the total span being 25ft., rise 4ft. 6in., and depth of arch 3ft., the virtual arch will be 18in. deep and 21ft. span, the horizontal thrust will be $2w$, the inclined thrust $2.21w$, and if w be taken as 1 ton per ft. run the maximum compression at crown will be $\frac{10.5 \times 2 \times 2}{1.5} = 28$ tons per sq. ft., which would be an excessive load except upon granite. HENRY ADAMS.

Dry Rot Fungus.

A READER writes: "I send you some fungus, and shall be glad to know whether it is dry rot. It was taken from under a kitchen floor. There are ventilators back and front and the concrete is dry. The fungus seems to have started at the floor level and worked down, as it only just reaches the last course of footings. Is it possible for dry rot to work through a gin wall? I may add the house is two years old and built in clay soil."

We submitted the fungus to Professor Bayley Balfour, Regius Keeper at the Royal Botanic Garden, Edinburgh. He states that it is dry rot, that its growth is due to dampness and insufficient ventilation, and that if there is timber for its passage, fungus will grow through a gin wall.

Buildings to Measure near Cambridge and Llandudno.

THORNTON HEATH.—H. G. T. writes: "Kindly name some buildings to measure and sketch in or near Cambridge and suitable for the testimonies of study required for the R.I.B.A. intermediate examination; also around Burnham-on-Crouch."

The measured sheet of Early English work had best be done at Ely Cathedral, permission being obtained in advance, and a window or door or a bay of a wall arcade or of the triforium chosen. Wet days could be spent in Cambridge itself, either in Trinity College Chapel or Trinity Church, preparing the Perpendicular sheet; while plenty of good subjects for the drawing from the round are to be found in either place. There are several good churches in the neighbourhood, but it is better to spend much time in a few good buildings than to try too much. Burnham-on-Crouch is not a good centre, for though the small Essex churches generally contain some one feature or more which will serve the purpose, there are no important buildings in the district.

G. A. T. M.

FOREST GATE.—S. J. writes: "Are there any buildings of note around Llandudno which are good examples for sketching?"

There is Conway Castle, within sight of Llandudno Junction; but otherwise the district is barren of architectural interest. However, time might be much worse spent than by making a plan of an important border fortress, with details of such mouldings, &c., as are to be found. G. A. T. M.

Party-Wall Awards.

LONDON.—S. writes: "Should the awards to party-structure notices be stamped at Somerset House? What is the cost of stamps for the award and duplicate? Should this be included in the amount agreed upon as surveyor's charges?"

The question is frequently asked whether a party-wall award under the London Building Act is required to be stamped, the text-books not supplying an answer to the question. Mr. F. Russell's elaborate work on Arbitrations, which is generally recognized as an authority, does not deal with cases under the London Building Act, and the late Mr. Banister Fletcher's book on Arbitrations, published by Batsford, which is mainly founded on the former work, deals with the subject in a very superficial manner. The Stamp Act of 1891 (54 & 55 Vict., c. 39), which re-enacts a considerable portion of a former Act of 1870 (33 & 34 Vict., c. 14), requires that every award shall be stamped, the value of the stamp varying from 6d. to £1 5s. according to the amount of the award. If, however, no sum is mentioned in a party-wall award a 6d. stamp is sufficient, the same as for an agreement. In order to save the expense of the stamp an arbitrator is sometimes directed, instead of making a formal award, to express his

decision in a certificate stating for whom and for what amount a verdict should be entered. This requires no stamp. It is to be observed that the want of a proper stamp is no ground for setting aside an award when no steps have been taken to enforce it. The third surveyor in a party-wall case is entitled to charge all expenses in connection with the matter in dispute, including the drawing of the award by a solicitor if he think fit. It is not usual, however, for an arbitrator to include his charges in the award, but to intimate to the parties that his award is ready and will be delivered to either of the parties applying for it on payment of the arbitrator's fees, the amount of which should be stated. The practice of the London County Council is to stamp party-wall awards with a 35s. stamp and duplicates with a 5s. stamp. Mr. Sydney Perks in his little work on party structures (p. 29), says: "I believe it is not usual to stamp party-wall awards. They should no doubt be stamped, but the amount of value of the work is rarely stated, consequently the cost of the stamp would be £1 15s.; but if an estimate of the work upon which the difference arises be made and stated in the award, the cost of the stamp would be much less. The list of amounts is printed in most diaries." An award usually contains a clause that all fees shall be paid on signing the same. It is desirable that an award should be drawn by a solicitor, as any mistake on points of law may make the award void. H.

R.I.B.A. Examinations.

GILLINGHAM.—M.S.A. writes: "Would an M.S.A. (member of the Society of Architects) be exempt from the preliminary examination of the R.I.B.A.? What are the fees for the intermediate and final?"

You will find all particulars in the Kalendar published at the offices of the R.I.B.A., 9, Conduit Street. The best plan for an M.S.A. would be to take the "Final" examination only, being a practising architect apparently.

Measuring Buildings: Descriptive Geometry.

HULL.—A. G. writes: "(1) Is there any book published giving hints on how to measure up old buildings? (2) Please also recommend a book on descriptive geometry?"

(1) See articles in our issues for April 10th, 1901, and August 20th and 27th, 1902. Spiers's "Architectural Drawing" contains a number of useful hints. (2) Warren's "Elements of Descriptive Geometry, Shadows, and Perspective," 15s., post free, from our offices.

Damp Room in Roof.

SHEFFIELD.—W. K. writes: "On the top of a bedroom ceiling in a two-storey lodge there is, in winter-time and during a long spell of damp weather, a moisture similar to condensation; but it cannot be condensation, because a fire is never used before the moisture appears. The ceiling is not flat, but extends to the ridge, being formed of laths and plaster. There is no leakage in the roof. The heaviest showers in summer do not penetrate. Another bedroom similarly situated—except that there is always a fire in the room underneath—is perfectly dry. The top of the window in both cases is about 4 ft. from the top of the ceiling. There are no air-grates."

The trouble seems to be due to insufficient ventilation. In damp weather it must be understood that the atmosphere is heavily laden with moisture and this will be sustained so long as the temperature of the air is not lowered. In the bedroom referred to this would happen on the ceiling, which is colder than the walls or floor by reason of the air at outside temperature in the roof and the comparative lower temperature of the

materials of the roof itself caused by the rain abstracting heat from materials in proximity, such as the plastering. The fact that another room in an exactly similar situation has no condensation of moisture shows that the temperature of the entering air is raised by the fire in the room beneath and so keeps in suspension the moisture, which is removed continually by ventilation. The proper remedy is to supply the necessary heat to keep the moisture in suspension by means of a fire, and form inlet and outlet flues. It would be possible also to remedy the dampness by placing an outlet flue on the external wall or ceiling and an inlet flue on an inner wall, thus introducing air into the room which has been warmed in the house to a temperature slightly above the outside air, so sustaining a greater quantity of moisture, which would not have any tendency to deposit itself on cold surfaces; such a course, however, would not be advisable, as fresh air should enter a room direct and not be already fouled in more or less degree in other parts of the house. The moisture in winter comes from the fires, gas or oil burned.

Damp-Resisting Paint and Warming Apparatus for Room.

WOLVERHAMPTON.—ENQUIRER writes: "(1) I have an old meeting-house to re-colour inside. What is the best damp-resisting material to use and will more than one coat be necessary? What is the cost per yd. super., including labour, &c.? (2) The same room requires warming. At present a coal slow combustion stove is used, but the pipe requires renewing every year, in consequence of the damp atmosphere, and has collapsed more than once. What inexpensive method of heating do you advise? The room is about 28ft. by 28ft. by 18ft. high. An open fireplace would not be convenient and any form of stove pipe would be best avoided."

(1) We suggest you use the damp-resisting paint made by Messrs. Sissons Brothers & Co., Ltd., of Hull and of Layton's Buildings, 199B, Borough High Street, London, S.E. The cost of this is 7s. a gallon, which quantity will cover between 80yds. and 90yds. super. This means that the cost of material is about 1d. per yd., making, with labour, &c. at 1½d., a total of 2½d. per yd. super. Messrs. Sissons' damp-resister is obtainable in several colours. (2) Shorland's Manchester stoves with descending smoke flues would probably serve your purpose best, but we advise you to apply to Messrs. E. H. Shorland & Brother, of Drake Street Works, Stretford Road, Manchester, for advice.

Architectural Modelling in Paper.

WIGAN writes: "Please recommend a book on modelling in card."

"Architectural Modelling in Paper," by T. A. Richardson, price 1s. 6d. post free from our offices.

Fireclay Stove.

YORK.—F. B. writes: "Is there such a thing on the market as a small slow-combustion stove made entirely of glazed fireclay—one that could be carried away in summer time and reconnected with the stove pipe in the winter?"

Apply to Messrs. Pither & Co., of 36, Mortimer Street, London, W.

Charges for Plans of Ruins.

BASINGSTOKE.—R. A. C. writes: "What would be a fair charge to make for a set of sketch plans (without sections) of excavation of ruins covering about 18 acres to a scale of 15ft. to 1in., and a set of plans of surrounding lands, about 360 acres, doubled in scale from Ordnance plan, to include measuring up excavations of ruins?"

The question so depends upon the time and trouble involved that we can only guess at a fair fee; we suggest £75.

Builders' Notes.

Messrs. W. B. Wilkinson & Co., Ltd., are executing the whole of the Granolithic paving for the courtyard and staircases at the new Nautical School, Portishead.

The St. John's Schools, Altrincham, are being ventilated by means of Shorland's patent exhaust roof ventilators, supplied by Messrs. E. H. Shorland and Brother, of Manchester.

Stable Fittings.—Despite the popularity of the motor car, the demand for high-class horse stable fittings shows no diminution, as may be judged from the fact that the Royal stables at Osborne, Lord Lonsdale's at Oakham, Lord Tennyson's at Freshwater (I.W.), the Hon. W. E. Guinness's at Knockmaroon Castle, Sir Meredith Burrell's at Knepp Castle and Sir Clinton Dawkins's at Polesden Lacy are all being fitted up by the St. Pancras Ironwork Co., Ltd.

A Rapid Piece of Bridge Work was recently carried out on the London, Tilbury and Southend railway at Bow where it crosses the main line, sidings and shops of the North London Railway Co. The old bridge, of 160ft. span, was to be replaced by a new one weighing 420 tons which had been built by the side of it, and on Sunday, July 9th, this latter was rolled into position over a timber staging—the time taken being only eleven hours. The work was carried out by Messrs. Head, Wrightson & Co., of Stockton-on-Tees, the contractors for the bridge, which was designed by Mr. James R. Robertson, M.I.C.E., engineer-in-chief to the railway, and carried out under the supervision of Mr. Sydney H. Ellis, the resident engineer.

Master-Builders at Scarborough.—All arrangements have now been made for the summer meeting of the National Federation of Building Trade Employers of Great Britain and Ireland at Scarborough on July 26th, 27th and 28th. On the Tuesday morning there is to be a meeting of the council at the Grand Hotel at 11 o'clock, an official welcome by the Mayor in the council-chamber at the Town Hall at 12.30, luncheon at the Grand Hotel at 1, meeting of the council in the afternoon, and a banquet at the Grand Hotel in the evening. On Wednesday there is to be a business meeting in the morning and a visit to the new Marine Drive works in the afternoon. On Thursday there is to be a drive through Forge Valley in the morning, and the afternoon will be spent on the sea.

Hopton Wood Stone.—The well-known firm of Killer Brothers, proprietors of the large "Hopton Wood Stone" quarries at Middleton, have recently incorporated their business as a limited liability company. It was founded by the father of the present senior member of the firm about seventy years ago, and one of the first orders received from outside the immediate locality was in connection with the new Houses of Parliament, large quantities of the stone being used in the interior of that building. The firm employ a very large number of men, and in addition to the quarries of Hopton Wood stone and limestone they have extensive stone sawing and polishing mills, besides which they supply the neighbouring village with gas. Among some of the orders executed by the firm in recent years are stairs and other interior work at the Royal Courts of Justice, Sheffield Town Hall, Derby County Council Hall, Royal Derbyshire Infirmary, Preston Free Library, and the new Midland Hotel at Manchester; and they now have on hand an order for a fine stone staircase for the new municipal buildings at Crewe (Mr. Henry T. Hare, architect). Messrs. Killer will retain the management of the business in their own hands, with

Messrs. J. Hodson & Son, of Lenton Boulevard, Nottingham, as their sole agents.

Mr. G. H. Widdows, A.R.I.B.A., architect in the borough surveyor's office, Derby, has been appointed building surveyor to the Derbyshire County Council, under the new Education Act. The commencing salary is £300 a year. There were 316 applicants.

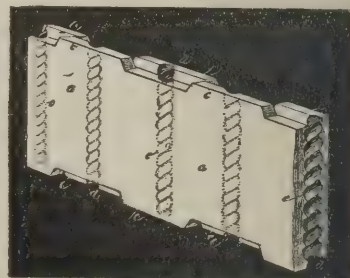
The Powell Wood-Process Syndicate, Ltd., of Temple Bar House, 28, Fleet Street, London, E.C., who are the patentees of the method of treating timber known as the Powell or sugar process, have taken premises at Carpenter's Road, Stratford, E., where they are laying down the necessary plant to demonstrate the commercial possibilities of their system. The plant consists of tanks to contain the solutions, a cylinder in which the timber is treated, and drying rooms to which the timber is taken after treatment. The plan of drying adopted is the hot-air system, with circulating fans. Every care is being exercised to make the plant thoroughly efficient, as hitherto the conditions under which the system has been worked have been of the crudest description. In order that timber users may have the opportunity of examining the results of the process, the syndicate invite them to send sample parcels of woods in the rough, not exceeding 5 cub. ft. in all, to their works, where they will be Powellized free of charge. The woods should be fully described and marked, so as to admit of verification and comparison with corresponding samples of natural woods kept for that purpose by the senders. Among the advantages claimed by the patentees for their process are the following:—(1) It enables timber to be seasoned rapidly without splitting or cracking it; (2) it increases the strength, toughness and durability of timber while lessening its porosity; (3) it affords resistance to dry-rot and other forms of decay; (4) it improves the appearance of woods used for decorative purposes; (5) it will be found highly advantageous to paving woods and railway sleepers; and (6) by it soft, sappy and comparatively poor timbers may be greatly increased in value and usefulness.

Trade and Craft.

Fireproof Partitions.

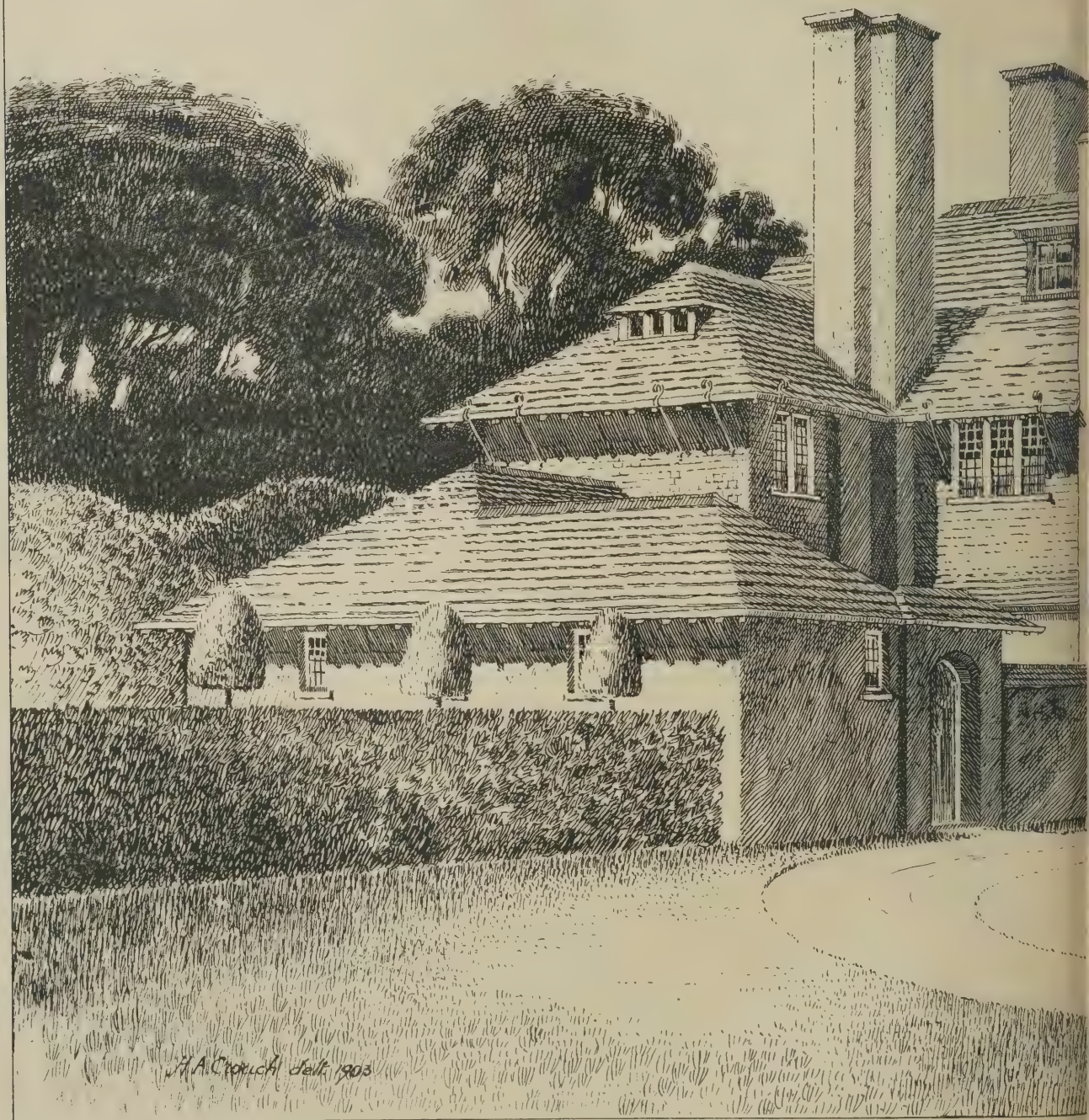
Messrs. Frederick Jones & Co. have just issued an interesting catalogue containing descriptive particulars and illustrations of their patent "Hercules" fireproof partitions. These are distinctly novel in design. They are built of blocks in the manner now so usual and can be erected with great rapidity; moreover, they dry quickly and so enable distempering, painting or papering to be done without delay. We illustrate one of the blocks on this page, from which it will be seen that they are rectangular in shape with alternate projections formed on the top and bottom edges and extending through nearly half the thickness, while a small channel runs longitudinally between the projections, and helical channels extend vertically through the partition. The blocks are built so to break joint, when the projections interlock, thus preventing transverse or longitudinal movement, and the vertical channels coincide so as to run continuously from the top of the partition to the bottom. Plaster grouting is poured down these patent screw-like vertical channels and runs along the longitudinal channels between the projections of the blocks, so that when the plaster is set the whole forms a solid, homogeneous partition of great strength and stability. The joints have to be stopped with plaster as the blocks are built up, in order to prevent the grouting running out. This latter is introduced into the vertical channels by boring holes opposite the channels

near the ceiling and pouring the liquid plaster into them by means of cans until the plaster rises to the ceiling. The grouting and jointing dry the same colour as the blocks. It will be recognized from our description that the special and particular advantage derived from the "Hercules" system of partitions is the simplicity of erection, while all other important, necessary and desirable functions are performed, such as resistance to fire and sound, lightness, strength, avoidance of rods or stays and metal coring, non-cracking, hygienic quality, economy of space and ease of cutting or sawing. As regards the weight, a square yard of 2½ in. blocks only weighs about 100 lbs., and other thicknesses proportionately. The fact that the helical channels give all the requisite strength without metal framework, rods or stays is a great advantage, for the rusting of iron in damp situations, with the consequent discoloration, and the danger of collapse under fire and water, are great drawbacks to the use of metal. The "Hercules" partitions have been well tested as to their fire-resistance



and will withstand the fiercest fire for a long time; even the sudden application of water does not cause warping, cracking or splintering. These partitions meet the requirements of the London County Council and District Surveyors. The blocks not being hollow, nor containing any organic matter (being composed principally of gypsum and plaster), cannot assist in the generation of microbes nor afford nesting places for rodents or vermin; while as they do not crack like ordinary lath-and-plaster partitions, and as they present a smooth surface, they cannot harbour germs. The strength of the "Hercules" partitions allows cisterns of average capacity or shelves to be carried by them. The partitions can be fixed on any foundation or floor. One other advantage deserves to have special mention. It is that the blocks take nails like wood. No wooden plugs are necessary, as in some partitions, and thus skirtings, picture rails, &c., can be easily fixed. The nails should be driven home slant-wise in a variety of directions to within a short distance of the wood and then carefully punched. The blocks are made either with a finished face both sides, upon which papering or distempering can be done soon after fixing, and with keyed faces which require only a skimming coat to bring to a smooth face; the "keyed" face also allows tiles to be fixed by rendering with cement and sand. The blocks 2½ in. thick are most in demand; they measure 3 ft. by 1 ft. 6 in. The other stock thicknesses, 3 in., 3½ in. and 4 in., measure 2 ft. 2 in. by 1 ft. 6 in. For special requirements, such as divisions in lavatories which have afterwards to be tiled, 1½ in. slabs are supplied which are armoured in course of erection to give additional strength. The catalogue contains numerous illustrations, suggestions as to fixing door frames, and other useful information. Messrs. Frederick Jones & Co. are noted for their fibrous-plaster slabs, which take the place of ordinary plaster for ceilings, walls, &c.; are fire-resisting, do not crack, and can be rapidly erected; and also as manufacturers of silicate cotton or slag-wool. Their address is Perrin Street, Ryland Road, Kentish Town, London, N.W.

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HOUSE AT RUGBY. JOHN W. SIMPSON.



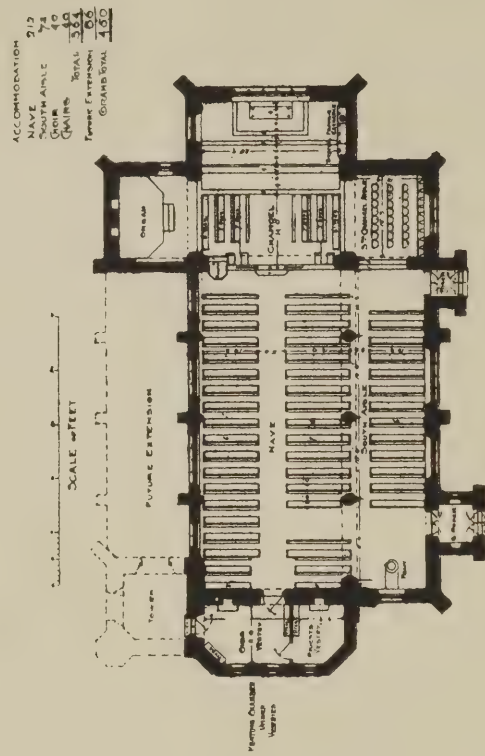
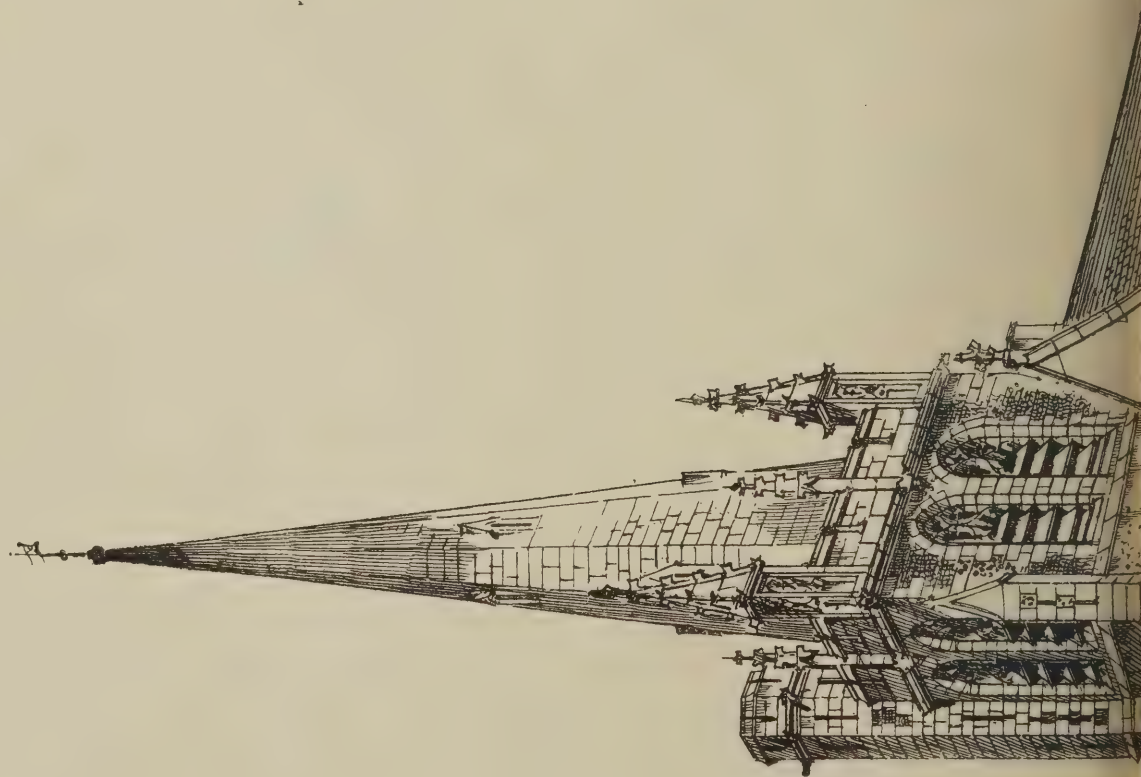
A. ARCHITECT. (ROYAL ACADEMY EXHIBITION 1904)

11, NEW TOWER, LONDON

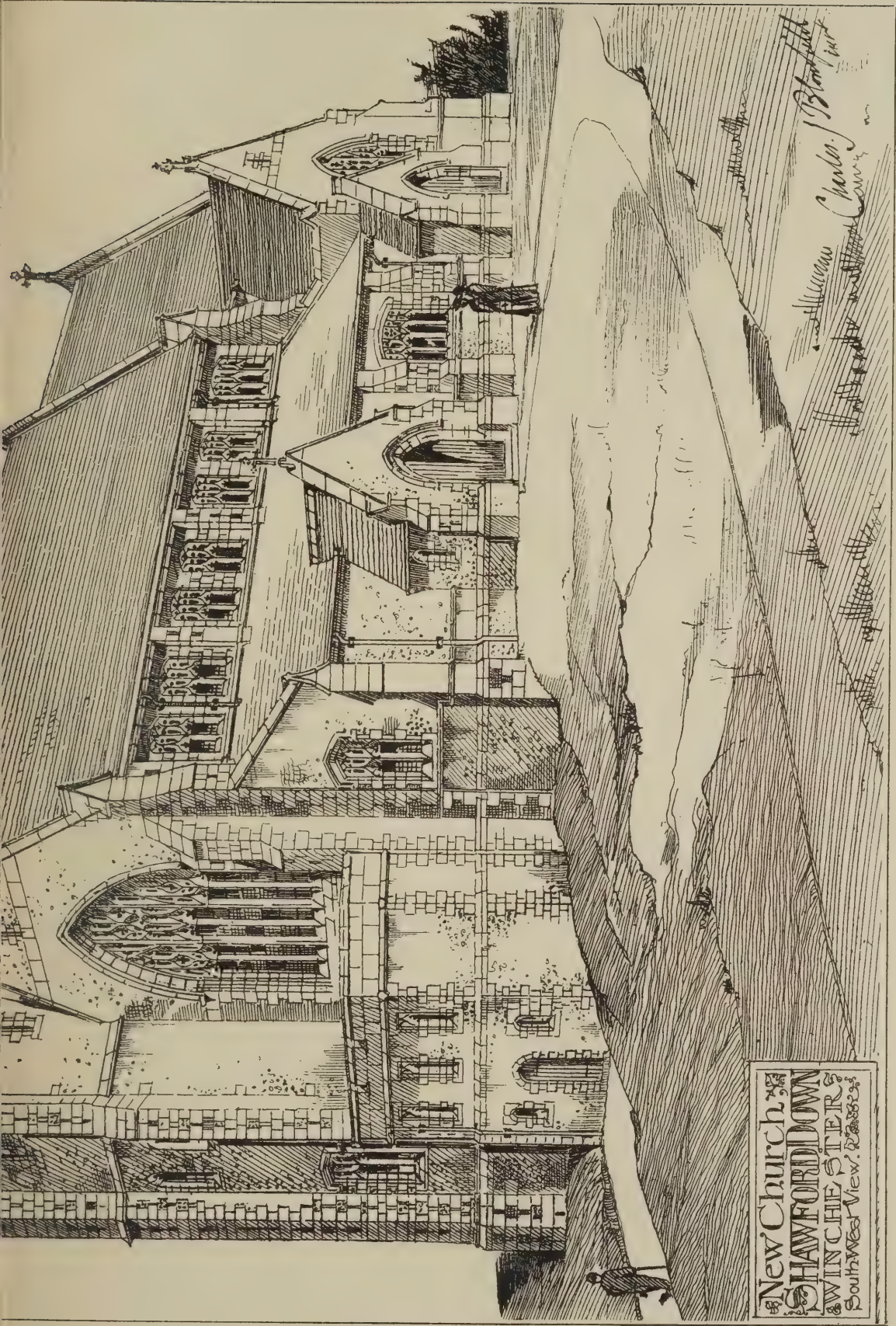
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*Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, July 27th, 1904.*



ACCOMMODATION	
NAVE	212
SOUTH AISLE	74
CHOR	40
CHAIRS	40
TOTAL	<u>364</u>
FOREST EXTENSION	<u>86</u>
GRAND TOTAL	<u>450</u>



New Church
SHAWFORD DOWN
WINCHESTER
South West View. J. B. Stoddard

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

July 27, 1904. Vol. 20, No. 494.

6, Great New Street, Fetter Lane, E.C.

Summary.

The Tariff Commission suggest that a duty of $6\frac{1}{2}$ per cent. should be put on all imported girders, joists and beams. (Page 41.)

It seems probable that the little church of St. Peter-le-Poor, Bread Street, will be pulled down. The only interesting feature about it is the plan, which is circular. (Page 47.)

In the R.I.B.A. preliminary examination held last June 143 candidates passed out of 193; in the intermediate, 77 out of 143; and in the final, 32 out of 67. (Page 46.)

One of the simplest means of ventilating a room is to substitute a "false rail" for that portion of the inside bead which abuts against the bottom rail of the lower sash of a double-hung window. (Page 50.)

Mr. Albert Toft is the sculptor chosen for the Birmingham Soldiers' Memorial. (Page 48.)

It has been calculated that the Colosseum at Rome accommodated 100,000 people. The height is given as from 160ft. to 180ft., but the tiers of seats inside did not rise to more than about half this height, the space above being necessary for ventilation. When such enormous crowds were packed closely together for several hours at a time on an Italian summer day, with an awning drawn over them, the atmosphere would have become pestilential if there had not been a considerable space overhead, and at least one range of open arcades for the free circulation of air. (Page 40.)

The R.I.B.A. annual dinner is to be held at Newcastle on October 7th. (Page 51.)

The Academy is open at half-price in the evenings of this week. (Page 48.)

Mr. L. K. Hall has been placed first in the Eton Memorial competition. (Page 48.)

A dispute has arisen between the City Corporation and the Benchers of the Middle Temple as to No. 17, Fleet Street, popularly known as "Wolsey's Palace," and it now seems indefinite when the present front will be taken down, exposing the old half-timber work behind. (Page 48.)

For the first time a building faced entirely with ceramic ware is to be erected in St. Petersburg. (Page 46.)

Considerable progress has been made with the new Government buildings in Whitehall. The present contract for the Local Government Board offices is £400,000, though the part under construction forms only part—rather more than half—of the complete block. A striking feature of this building will be the circular interior court, which has a diameter of 164ft. The new War Office will cost £650,000. (Page 45.)

Newspaper Criticism of Liverpool Cathedral.

We make a point of referring occasionally to newspaper criticisms of architecture because the daily press is in such an influential position to direct public opinion. It is therefore all the more regrettable that one so rarely sees any enlightened views on architecture expressed in the newspapers, which seem to be content to relegate the work to totally uninformed persons. Now and again, however, we find some sort of intelligent criticism, even though it savour strongly of the archæologist rather than the modern architect keenly alive to the needs and movements of the day. Thus, for example, the "Daily Telegraph" on Liverpool Cathedral: "Taking the design altogether, it is something to be thankful for that it is old-fashioned, not, as the modern cant goes, 'up-to-date.' Modernity so far has not done much for church building; generally it is incongruous, as in Holy Trinity, Sloane Street, where the late Mr. Sedding expended a wealth of thought in producing many beautiful parts, which resulted in an agglomeration of fidgity odds and ends; or it is massively ugly, as in the cathedral at Westminster. The cry for a national style in architecture is often heard. It is a helpless cry. No good style ever came into existence at the bidding of any one architect, or even of any group of architects. Style is the resultant, very slowly manifesting itself, of the best minds adapting themselves to conditions. Gothic church architecture grew with the centuries, and the conditions to-day are essentially the same as when Salisbury, Lincoln or Norwich were built. Partly from the pleasures that necessarily arise from the association of ideas, but surely most of all from the fact that a high degree of fitness must have resulted from many generations of exalted minds working towards one object, any serious departure from the main lines of church building results in failure, as, for example, St. Mary's, Warwick; or, again, the Nonconformist churches, built in defiance of tradition, where it is difficult to point to one, architecturally speaking, worth the having. Mr. Scott has shown a true artistic instinct in abiding by the old traditions, with minor variations, rather than seeking to advertise himself with mere newness of design." This is the Gothicism with a vengeance. And what shall we say to the massive ugliness of Westminster Cathedral, or to the suggestion that Liverpool Cathedral offers just the same conditions as Salisbury did? Simply that the "Telegraph"

critic is imbued through and through with the narrow spirit of the Gothic sentimentalist—one who speaks about church architecture as if it only existed in the Middle Ages. It is interesting to compare the foregoing with Mr. Norman Shaw's and Mr. Bodley's remarks about Liverpool Cathedral and then to consider Mr. Shaw's expressed opinion that Westminster Cathedral is the most notable that has been built for 200 years.

Why Restore Iona?

IONA is by no means easy of access, and it is not often that news of the place reach the outside world. A correspondent, however, who has lately visited Iona, reports that substantial progress has been made with the restoration of the ruined abbey church, erroneously called a cathedral. The choir, south aisle and south transept have been roofed in, the window openings glazed, and the massive square tower also roofed in. It is intended to roof the sacristy (on the north side of the choir) and to complete and roof the north transept. With this the work will stop, unless additional funds are forthcoming, which it is to be hoped will not be the case, as it appears that what has been done is unsatisfactory and has not improved the appearance of the venerable building. The abbey church was until recently a ruin, the roofs having fallen in and the tracery of the windows destroyed. In 1561 the abbey suffered from the Act of Parliament enjoining the demolition of all abbeys of monks and friars. The island passed into the hands of McLean of Desart at the Reformation, but from 1567 onwards the Protestant bishops of Argyll and the Isles seem to have had the abbey in their possession. The buildings were neglected, and although Charles I. in 1635 directed a sum of £400 to be spent in repairs, this was not done, and towards the end of the seventeenth century the buildings had fallen into ruin. In 1693 the island of Iona passed into the hands of the Duke of Argyll, but the buildings fared no better under their new owners until the advent of the late Duke, who carried out some repairs. In 1812 there was neither church nor school on the island. Subsequently the Government erected a church and a manse, and this was followed by the erection of a free church and school. The spiritual wants of the island are amply provided for, the population, which in 1798 was about 330, being now only 250. The restoration of the abbey church is quite unnecessary, a simple roof to protect the walls being all that was needed.



THE COLOSSEUM AS SEEN FROM THE PALATINE.

THE COLOSSEUM TO-DAY.

By MAUD BRETtingham.

THE erection of a Colosseum in London calls to mind the greatest theatre of antiquity, which after nearly 2,000 years still stands unrivalled and unapproachable in its architectural integrity. Constructed with eighty arches for entrance and exit, and erected in an open space with no surrounding buildings to hamper circulation, its exits all round enabled the 100,000 spectators to disperse in ten minutes; which fact clearly shows that, so far as considerations of safety are concerned, the situation of a theatre is of greater importance than any internal arrangement. It is true that space and to spare is an impossibility in metropolitan centres, but perhaps the day will come when our new theatres will be erected in free spaces in the suburbs, the ever-increasing facilities for locomotion being in favour of such a plan.

Among the repairs of brickwork, there is sufficient of the original left to prove that the Colosseum was entirely built of travertine. The accompanying photographs show the travertine blocks, the modern brickwork and repairing up to date, and the restored staircases, also the level of the arena.

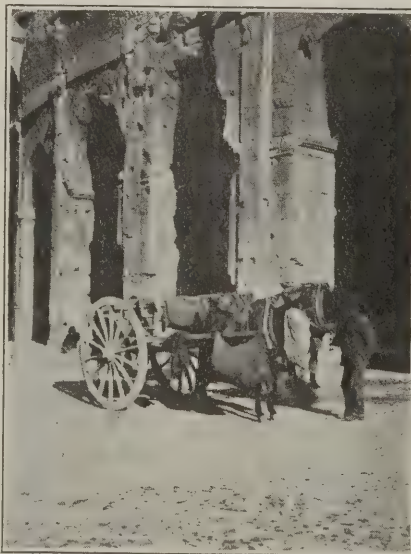
The photograph on the opposite page shows the excavations of the area, below the arena. This was flooded for naval fights, and after these were discontinued, animals were kept in dens all round, and walls were built with chambers to contain machinery, scenery, as well as lifts to send men and beasts to the arena above. Storage rooms and drains are still being traced, and the original uses of some large wooden framework discussed and disputed.

Time was when the flora of the Colosseum was a study *per se*, for the saturated soil produced a marvellous vegetation, numbering over 400 specimens of wild flowers.

The external elevation of the Colosseum consisted of four stages, each adorned with engaged columns of the three orders of Greek architecture. The lowest three were arcaded, having eighty columns and as many arches. Those of the basement storey served as entrances; seventy-six being numbered and allotted to the general body of spectators, while four, at the extremities of the axes of the ellipse, were the principal entrances. The higher arcades had a low parapet with (apparently) a statue in each arch, and gave

light and air to the passages which surrounded the building. The openings of the arcades above the principal entrances were larger than the rest, and were adorned with figures of chariots. The highest stage was much more solid, being composed of a continuous wall of masonry, only pierced by forty small square windows. The object of this may have been to obtain the necessary solidity and weight for steadying the poles which supported the awning, and must have had to carry a severe inward strain. The alternate arcades were ornamented with metal shields. There was also a series of brackets to support the poles on which the awning was stretched.

The interior may be naturally divided into the arena and the cavea, with their respective appendages. The arena was the portion assigned to the combatants, and derived its name from the sand with which it was strewn, to absorb the blood and prevent it from becoming slippery. Some of the emperors showed their prodigality by substituting precious powders, and even gold dust, for sand. The arena was generally of the same shape as the amphitheatre itself, and was separated from the spectators by a wall built perfectly smooth, that the wild beasts might not by any possibility climb it. At Rome it was faced inside with polished marble,



SOME OF THE EIGHTY ARCHES OF THE COLOSSEUM. THE HOLES WERE MADE IN THE MIDDLE AGES TO EXTRACT THE IRON CLAMPS.

but at Pompeii it was simply painted. For further security it was surrounded by a metal railing or network, and the arena was sometimes surrounded also by a ditch, especially on account of the elephants. Connected with the arena were the dens from which the beasts came, and the rooms where the gladiators met before the show began. In spite of the excavations which have been made, it is not very easy to understand how all the effects described by ancient authors were produced; for after the regular shows were over, the arena was sometimes filled with water, and sea-fights were exhibited with ships.

The part assigned to the spectators was called the cavea. In the different amphitheatres whose ruins have been examined there are some differences in the arrangements, but the general features are nearly the same in all. The cavea was divided into several galleries, concentric with the outer walls, and therefore, like them, of an elliptic form. The place of honour was the lowest of these, nearest to the arena, and called the podium. The divisions in it were larger, so as to be able to contain movable seats. At Rome it was here the emperor sat, his seat bearing the name of "suggestum." The senators, principal magistrates, vestal virgins, the provider (editor) of the show, and other persons of note occupied the rest of the podium. At Nîmes, besides the high officials of the town, the podium had places assigned to the principal guilds, whose names are still seen inscribed upon it, with the number of places reserved for each. In the Colosseum there were three "mæniana," or galleries, above the podium, separated from each other by terraces and walls. The lowest was appropriated to the equestrian order. Numerous passages and small stairs gave access to them, while long covered corridors, behind and below them, served for shelter in the event of rain. At Pompeii each place was numbered, and elsewhere their extent is defined by little marks cut in the stone. The spectators were admitted by tickets, and order preserved by a staff of officers appointed for the purpose.

The height of the Colosseum is given as from 160ft. to 180ft. The seats in the interior do not rise higher than the level of the third order of the exterior, that is, about half the entire height of the building; and this apparent excess of height beyond what was made available has led some to suppose that there were upper seats and galleries, of which no trace now exists. The height, however, appears to have been necessary for the ventilation of the building. When such enormous crowds were packed closely together for several hours at a time on an Italian summer day, with an awning drawn over them, the atmosphere would have become pestilential if there had not been a considerable space overhead, and at least one range of open arcades, unencumbered by any galleries, to prevent the free circulation of air. Scented liquids were at times squirted over the spectators from concealed tubes; but no aroma would have compensated for the want of air which the arcade all round the building, above the spectators, would supply. There may also have been another series of openings serving the same purpose between the top of the wall and the edge of the awning. It has been calculated that the Colosseum contained 87,000 places, and that besides these, 15,000 more spectators could be admitted. The greatest length is about 612ft., and the length of the shortest axis of the ellipse about 515ft. The dimensions of the arena are variously stated by different writers, some making it 247ft. by 150ft., and others 281ft. by 176ft.—Encl. Britt.]

During the Middle Ages the Colosseum was plundered considerably, but Benedict XIV. consecrated the interior by erecting crosses and oratories and so preserved it from further depredations.

FOREIGN COMPETITION IN GIRDERS, BEAMS AND PILLARS.

Extracts from Tariff Commission
Volume.

THE first volume of the Tariff Commission, just issued, contains a mass of figures, facts and opinions about the iron and steel trades, from which we have extracted the following as having particular relation to the building industry of this country:—

Suggested duty (*ad valorem*) on imported girders, joists and beams—6½ per cent.

Imports: Girders, Beams and Pillars
(in thousand tons).

Year.	Holland.	Belgium.	Total from all Countries.
1893 - -	22	44	66
1894 - -	18	51	69
1895 - -	13	56	69
1896 - -	16	59	75
1897 - -	14	61	76
1898 - -	15	83	103
1899 - -	12	74	95
1900 - -	13	77	93
1901 - -	18	102	123
1902 - -	22	104	127
1903 - -	31	113	145

Of the six important syndicates in Germany the Girder Syndicate has its head office at Düsseldorf, in the same building as the Steel Syndicate. It was constituted in the year 1899 and, like the Pig Iron Syndicate, comprises three sections: (a) the South German Girder Syndicate, founded in 1884, which comprises the rolling mills of the Saar district and of Luxemburg, and has its office at Saarbrücken; (b) the Girder Syndicate of the Lower Rhine and of Westphalia, with its head office at Düsseldorf, the operations of which extend to the north of Germany; and finally (c) the Peine Works, in Hanover, which supply that province and Eastern Germany. The prices fixed by a syndicate for all kinds of goods produced are by no means the same in different districts, or even in the same district for different customers. Distant customers are charged a lower price, lower approximately by the cost of freight from the place of production to the factory of the purchaser; nearer customers are charged a higher price, on the ground simply that their proximity to the centre of production will enable them to afford to pay more money. On the other hand, in a dis-

trict in which there is no active competition, a higher price is charged than in one where there is competition already in existence, or other sources of supply either actually compete, or where it is likely to come into existence and interfere with the production of the syndicate. The same thing is sold at different prices according to circumstances, the syndicate, in every case, charging all that the trade will bear. During the last few years, the German home market being practically ruled by the iron syndicates; the latter regulate their prices according

to those of the United Kingdom by adding to the British price, customs, freight, &c.

In May, 1903, the German home price for girders was 112 marks; export price 75 marks.

In answer to questions:—

Firm No. 312: "The cheapest and best equipped works are able to make, at present cost of raw material and wages in Germany, pig iron into joists or beams at 31 marks per ton. This is bare works cost, without any charges for depreciation, general charges or interest. To-day's price of German joists f.o.b. Antwerp is 82½ marks per ton, usually less a discount of 2½ per cent. The home price of beams in Germany is 105 marks per ton f.o.b. works."

Firm No. 842: "Varnishes were formerly got by us entirely from Great Britain. America is now doing a share of the trade, due to their cheaper prices for similar qualities."

Firm No. 785: "In 1903 we tendered to the ——— Corporation for 700 tons of large cast-iron water pipes. Although we quoted a price which left us little or no profit, the French makers took the order at about 4s. per ton under our quotation. We also quoted for 1,150 tons of cast-iron pipes for delivery into ———shire and in this case the French makers secured the order, their price being lower than the lowest English price. French pipes have also been purchased at ——— (Lincolnshire) at about 4s. per ton under our cost and railway rate, and at many other places. Their quotation for cast-iron pipes for ——— Corporation was the lowest a short time ago, notwithstanding that our and several other large pipe makers' works are within 25 miles distance."

Firm No. 886: "Belgium.—Steel girders and joists, light steel rails, iron bars. There is no doubt that such articles are sold here cheaper than in the country where produced, and that the makers are compensated by the better prices obtainable at home, owing

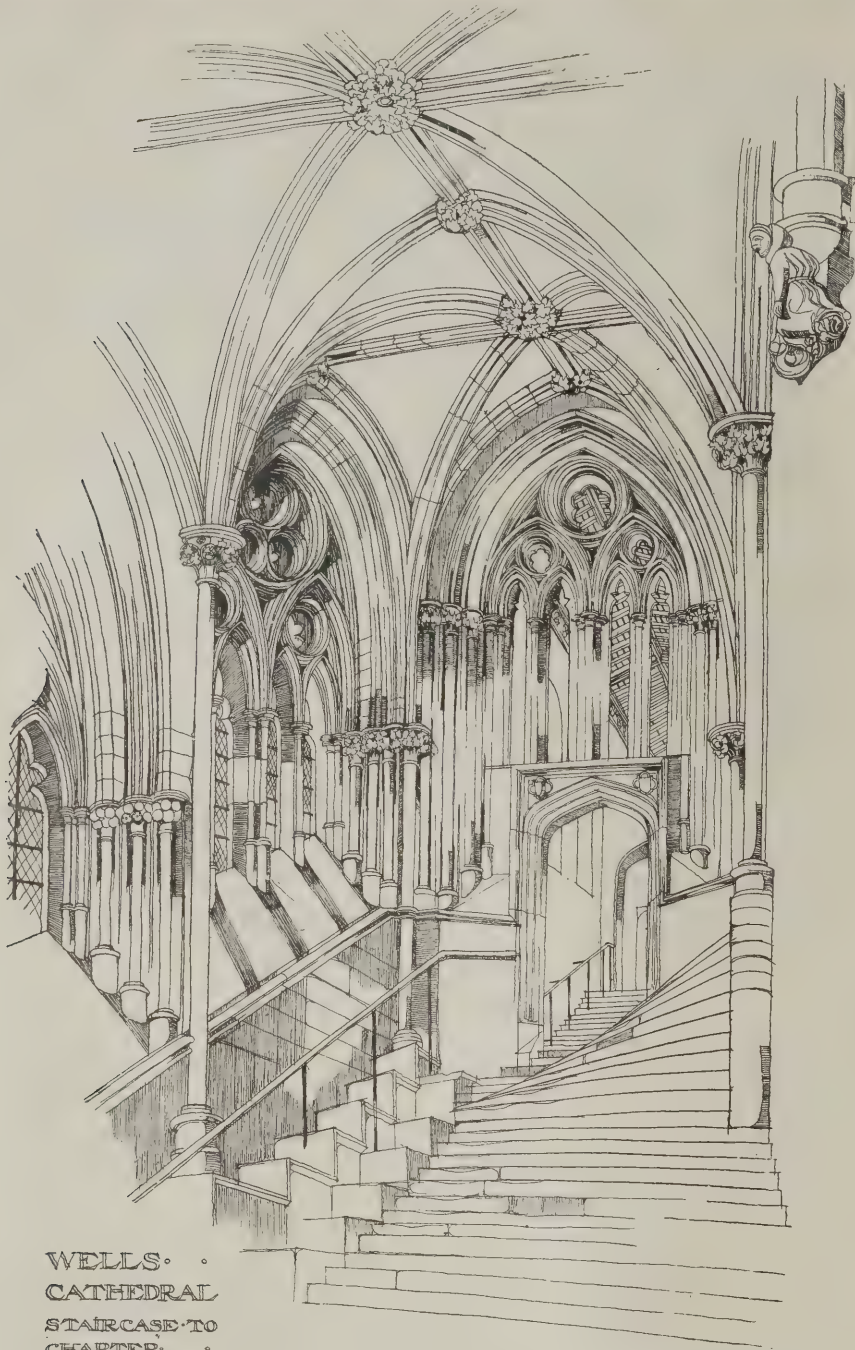
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THE COLOSSEUM TO-DAY: BRICKWORK REPAIRS.



THE RAILING ON THE ARENA AND THE AREA EXCAVATED BELOW.



WELLS.
CATHEDRAL
STAIRCASE TO
CHAPTER-
HOUSE. • WSAG

DRAWN BY W. S. A. GORDON.

This staircase leads from the eastern aisle of the north transept to the chapter-house on the right, and then straight ahead over the chain bridge into the Vicar's Close. It was finished before the chapter-house (1292). The style is Geometrical Decorated. The shafts are of blue lias with caps showing naturalistic foliage. Under the windows the whole way up are stone seats stepped to the rise of the stair with foot paces under.

to their tariffs, which protect their home trade. The plants in Belgium, Germany and America are of modern equipment, and capable of producing more than their normal home consumption, therefore, with the object of keeping these works fully employed, they send their surplus here."

Firm No. 1,263: "Columns and girders for structural work; and bolts, nuts and railway fastenings. Belgium and Germany.—Steel riveted girders and columns, and bolts and nuts. We believe that such imported articles are placed from time to time in the British market at or below the normal cost of production in the country of origin, but it is very difficult to give the exact figures, as from time to time such sales are treated by the sellers as averaging with their home or other sales which they may have made."

Firm No. 886: "Foreign materials have latterly made considerable inroads on markets formerly more largely supplied from the

United Kingdom. We have of late years experienced a loss of a great deal of our export business in bar iron, steel girders, channels, angles, tees, &c., notably in China, Japan and Egypt, which business has been secured by our foreign rivals."

Firm No. 1,568: "For some years, up to the autumn of 1900, a large firm of galvanizers and makers of tanks and cisterns regularly bought from us about 500 tons of steel sheets per annum, but at that time they commenced using Belgian or German material, with the result that they bought nothing from us in the years 1901 and 1902, and only five tons in 1903. The effect of this upon our workmen was that they lost from 300 to 350 shifts works over the three years, or about £900 in wages."

Witness No. 6: "We manufacture rolled steel girders and all sectional material for ship, bridge and wagon building, and other structural work. Our output for 1903 was

one-fourth less than our furnace and mill capacity; 80 per cent of that output was sold for consumption in the United Kingdom, 7½ per cent. for foreign consumption and 12½ per cent. Indian and Colonial consumption . . . Foreign steel will not pass the special tests, so that the article we produce is a better one, and worth a higher price. At the same time, we cannot possibly test foreign dumped steel in the same way as we can test our own. The material cannot be ear-marked; it must be tested at the works. In the case of a large order given abroad, the engineer appoints someone on the spot to examine everything, but that is not the competition that we experience. It is the competition where a man gets 200 or 300 tons into his works, either out of store or out of part cargo of the steamer. Though the material we would supply would be better than that supplied by the foreigner, yet this foreign material is good enough for the order. To a builder, a girder is a girder, whether it is basic steel or German steel, or any other steel. We cannot produce the cheaper article since we make Siemens-Martin steel, which is all of one quality. . . . We have already experienced very great advantage from the standardization of sections, and it is saving us a great deal of money in making rolls. Every engineer and every architect has his own particular fad about section, and insisted on having it. Now it is quite enough to answer them if we simply say we can only make standard sections, and they agree to accept those. . . ."

The offices of the Tariff Commission are at 7, Victoria Street, S.W., and the price of their first volume (to be obtained from the publishers, Messrs. P. S. King & Son, Great Smith Street, Westminster) is 2s. 6d. nett, post free 2s. 10d.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Essex Churches.

BRENTWOOD.—H. R. B. writes: "Please name a book containing a full description of the church of St. Peter and Paul, Standon Massey. I should also be glad to know if there is a book published on the Essex churches."

An exhaustive search has failed to discover any information about the church at Standon Massey. Hadfield's "Churches of Essex" and Buckler's "Twenty-two Churches of Essex" are both good books. M.

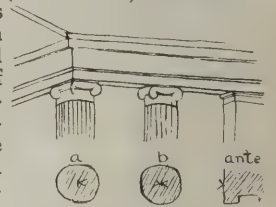
The Erechtheum.

LEYTONSTONE.—STUDENT writes: "What are the distances (in modules) between the centre of columns *a* and *b* on sketch and between *b* and face of antæ of the northern portico of the Erechtheum? I have looked up several of the best authorities, but have not been able to obtain the distances."

b to antæ 8'9 and *a* to *b* 10'2.

Architects' Assistants.

C. L. writes: (1) "What qualifications should one have after serving articles with an architect and land surveyor? (2) Would it be advisable to commence as junior assistant in London, or a smaller town? (3) What



pay ought I to expect at first as junior assistant? (4) Are you expected to have your own instruments? (5) Do you think there are too many assistants in England—would not New Zealand be better? (6) Which is the best way to obtain a situation either in England or New Zealand?"

(1) We can only reply that you should have the knowledge necessary to pass the examination of the Royal Institute of British Architects and that of the Surveyors' Institution in land surveying. See the regulations and hints in the official publications of these societies. (2) We should advise experience first in a provincial town and then in London in several well-known architects' offices. (3) About £1 to 30s. a week, according to ability. (4) Yes. (5) and (6) There are more openings in New Zealand but no one ought to think of going out there without sufficient capital to remain in the country for a year, if need be, acquiring a knowledge of the country and local conditions and seeking work. In London the plan of obtaining a situation is to call on architects with testimonials and specimens of work and to advertise and reply to advertisements in the weekly professional journals. In New Zealand an assistant would apply personally to architects, or, where this was not possible, would write to them, and also advertise in the press of the country.

Connections with Sewer.

ESSEX writes: "(1) I have recently erected a house 85 yds. from a sewer. A gin. drain was run from it to the sewer and paid for by my client (£50). A person who owns land on the opposite side is about to erect two houses and connect to the drain laid by my client. Can we not stop this until my client is paid, say, £20 towards the cost of the drain? (2) Can the local authorities prevent me connecting to a sewer on the ground that it is not of sufficient capacity to drain both sides of the road?"

(1) The point raised is a novel one. The drain is a single private one, belonging to your client. You can prevent the opposite building owner connecting at all, as he has only a right to connect to a public sewer, which this is not. The local authority on the other hand has a right to prevent him connecting to the drain, or you arranging with him to do so, as the drain from the point of his connection would become a public sewer repairable by the authority, the two premises not being in the same curtilage. If the authority consents to the opposite owner connecting to your drain, thus sanctioning the creation of a sewer from the point of junction, your client should obtain from the authority the cost of constructing the length of sewer. Neither your client nor the opposite building owner can be made to construct sewers for the authority under the circumstances mentioned. On the other hand the local authority cannot compel either your client or the other owner to connect to a sewer, there being no sewer within a hundred feet of either premises.

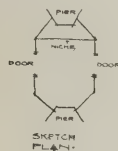
(2) This is a more difficult point. The authority is required to make and maintain sewers adequate for the proper drainage of the district. If it can prevent you connecting to a sewer of insufficient capacity, there seems a probability also that your client can compel them to provide a sewer adequate to the needs of the district.

A Tour through Gloucestershire and Oxfordshire.

SWANSEA.—J. H. J. writes: "I intend making a cycle tour through Gloucestershire and Oxfordshire for my holidays. Kindly give me an idea of the best route to take and some of the buildings, &c., in the neighbourhood worth sketching. I should be glad you would advise me as to stopping places and hotels. I should like to include such

towns as Gloucester to commence, Tewkesbury, Banbury, Oxford and Burford, finishing up at some place where I could catch a train back to Swansea. Do you think the programme too long for a week or ten days? Kindly name an inexpensive guide to this district."

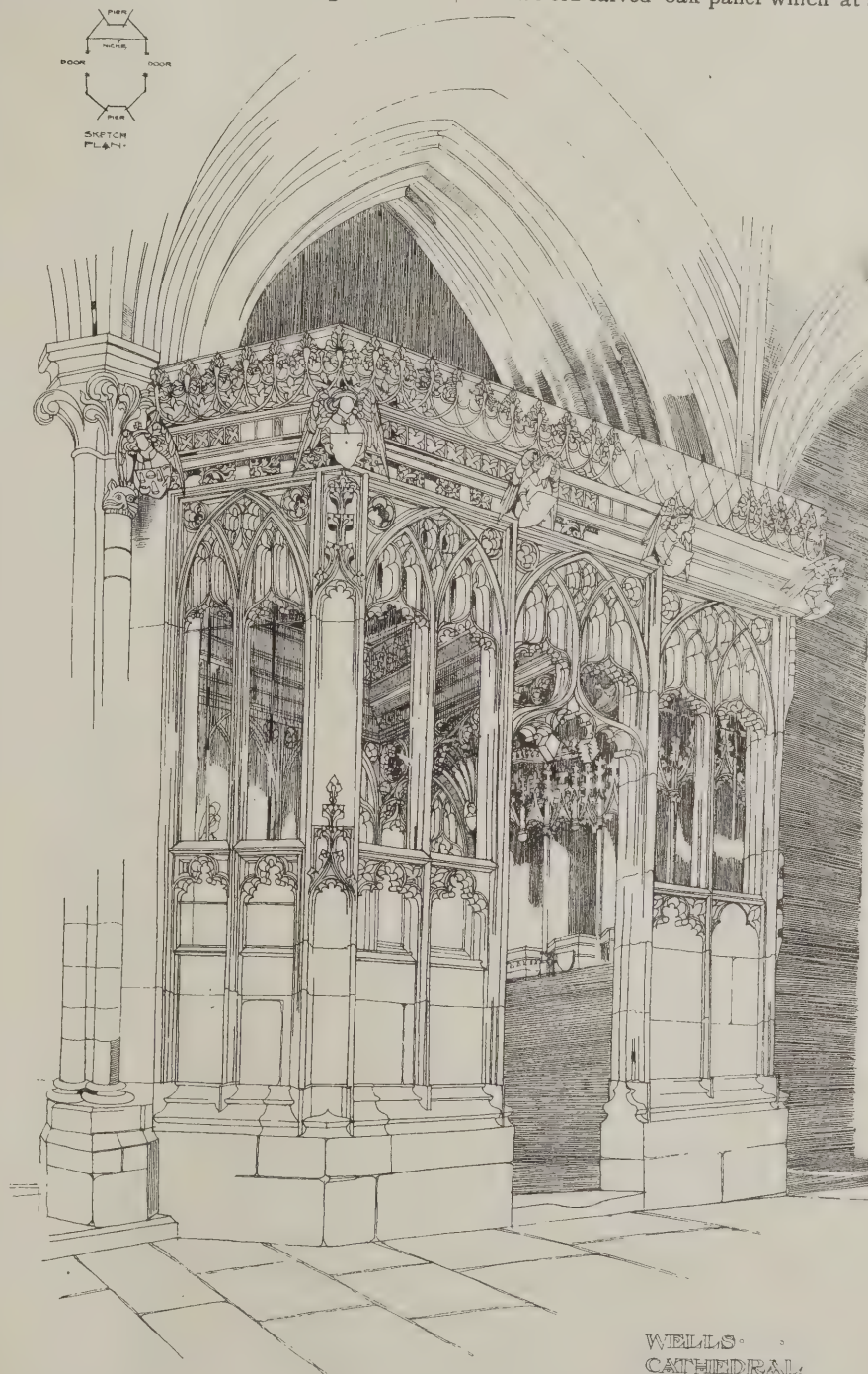
At Gloucester (hotels—Bell, Spread Eagle and Wellington) you would do well to spend two or three days sketching, and then go to Tewkesbury, calling at Deerhurst on your way, where are some old Saxon remains. At Tewkesbury (Swan, Bell) there is plenty of material for sketching, the abbey being a fine example of Norman work, containing beautiful Decorated and Perpendicular work also. Leaving Tewkesbury and taking the Oxford Road you will pass Ashchurch, Winchcombe, Burton-on-Water and Burford, all of which contain interesting churches.



Leaving Burford you come to Witney, where you will find a fourteenth-century church. Just south of Witney are Ducklington and Bampton Churches, thirteenth century. Arriving at Oxford you will find ample work, and if you have time you would do well to visit Iffley (Norman), Dorchester (Decorated), Ewelme (Perpendicular), Chinnor, Shirburn and Pirton, all within easy distance of Oxford; but enough has been mentioned to occupy weeks instead of days, if serious work and not a cycling holiday be intended. Tourist's Guide to Gloucester, Worth, 2s. Walk through Oxford, Parker, 6d. Alden Guide to Oxford, 6d.

Removing Plaster on Oak Panel.

TRENTANT.—R. writes: "I purchased at a sale an old carved oak panel which at some



WELLS
CATHEDRAL
SUGAR
CHAPEL

DRAWN BY W. S. A. GORDON.

This chapel is situated in one of the bays of the nave, and is hexagonal on plan. The altar is covered over with very delicate fan tracery, and the reredos is formed by five niches which originally held figures, but are now empty. The whole is executed in stone and is in a splendid state of preservation.

time has been covered with a thin coat of plaster-of-Paris. How can I remove this without injuring the carving? Will some chemical be effective?"

It would be dangerous to use a chemical to dissolve the plaster, as it might cause injury to the wood. The best plan is to scrape as much off as possible, taking care not to rub the wood, and then to place the panel in cold water, which should be changed frequently, as gypsum is slightly soluble in water. If running water is available this would be better.

Buildings to measure around Pwllheli, Swanage and Chatham.

BLACKBURN.—A. A. A. writes: "Are there any buildings within easy cycling distance of Pwllheli (North Wales) which can be considered suitable to measure for the R.I.B.A. intermediate examination?"

At Valle Crucis, near Llangollen, there is a very fine abbey church. It is a good example of the twelfth-century transitional period, and also has some fourteenth-century work, and the monastic buildings are easy to trace and very interesting. It was founded by the Benedictine Order and afterwards taken over by the Cistercians. The only other places worth study are the castles at Harleck, Carnarvon and Conway. There is a small fee to be paid at Valle Crucis to the caretaker, to whom the place is farmed. He is a well-informed gentleman who depends on these fees for his livelihood.

G. A. T. M.

BLACKHEATH.—A. B. writes: "Can you tell me of any work near Swanage suitable for measuring?"

There is very little architectural work near Swanage suitable for measuring. At Corfe

Castle there are some good examples of Norman work, and at Wareham there is a fourteenth-century church possessing possibly a good feature for measuring. If you wish to go farther afield, Maiden Newton, Piddletton, Beaminster and Cerne Abbas contain good architectural studies. M.

LEYTONSTONE.—STUDENT writes: "Kindly name some buildings around Chatham which are worth sketching. To whom should I apply for permission to sketch, if necessary?"

Rochester is quite close to Chatham, and contains plenty of good sketching material. The castle keep is one of the finest remains of its kind in the country. It is, I believe, now under the charge of the mayor and corporation, whose permission should be officially sought for sketching there; while the dean should be similarly approached for permission to work in the cathedral. This is a small building of its class, but contains interesting and typical Norman and Early English work. "Restoration House" is in private ownership, and is a small example of the Elizabethan period, containing a good staircase; while there is another Elizabethan house in one of the main streets, of half-timber, with twin overhanging gables, which is also privately owned. It is picturesque, with well-detailed panelling internally; and is generally recognized as the scene of the girls' school episode in "Pickwick."

G. A. T. M.

Overlooked Premises.

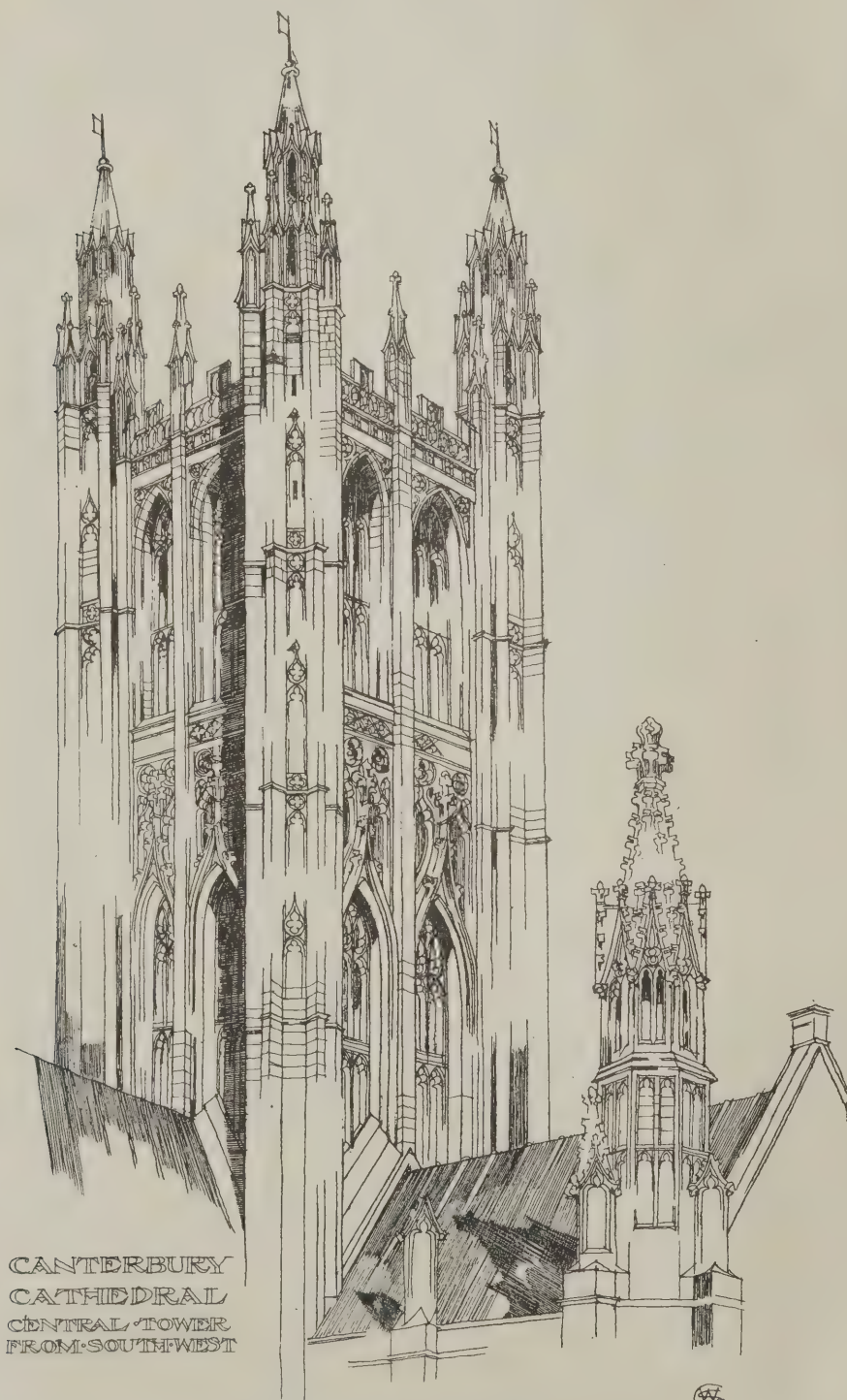
SALOP.—WINDOW writes: "Some time ago a friend of mine (A) who owns a certain property was approached by the owner (B) of the adjoining property, who, on the plea that a wooden cart shed was to be replaced by one of bricks and tiles, asked for an alteration of the boundary (which would give him a good road) and offered to build a brick wall 4ft. high in the place of an existing boundary hedge. This was verbally agreed on between the two owners. The cart shed has, however, developed into a couple of rooms whose windows overlook A's property. Can B legally heighten the wall so as to prevent A overlooking his property from the new windows? The old and new distances from the houses are 6ft. and 54ft. respectively. The small window on A's property has been in existence twenty years or more."

On the facts as stated you are certainly entitled to raise the fence or obstruct A's outlook by any means you please. He cannot plead ancient lights except for an opening of exactly the same size and in the same position as the original small window, now done away with.

Tomb Stone Rubbings.

LEICESTER.—C. V. H. writes: "Kindly explain how to take rubbings of tomb stones. Please also state what special points to observe in making a choice."

We cannot spare space to deal with the historical features of ancient sepulchral monuments; you should look up books on the subject of monumental brasses and tomb stones in libraries such as the Royal Institute of British Architects, the Architectural Association, or the British Museum. Various materials are used. Ordinary white detail paper 20½ in. wide is good enough, but the quality should be thin. Heelball is generally used, such as that made by Mr. Francis Ullathorne, 7 and 9, Gate Street, Lincoln's Inn Fields, price 6d. and 1s. a piece. A composition known as a brass-rubber, giving an exact facsimile, is also used, but we are unable to say where it may be obtained. Black lead and oil or black lead alone (the ordinary stove lead) and paper are also used; the first has the objection of being a very dirty process.



CANTERBURY
CATHEDRAL
CENTRAL TOWER
FROM SOUTHWEST

DRAWN BY W. S. A. GORDON.

This tower, known as the Bell Harry Tower, belongs to the Tudor period, 1495-1503, and is remarkable for the unbroken verticality of its buttresses.

Correspondence.

Buildings to Measure around Llandudno.

To the Editor of THE BUILDERS' JOURNAL.

LONDON.

SIR,—Referring to "G. A. T. M.'s" reply to a correspondent in your issue for last week as to buildings to measure at Llandudno, and the district being barren, I think that "S. J." could find a good deal if he looked. For instance, Plas Mawr, at Conway, is an extremely fine instance of an Elizabethan House, with splendid ceilings and fireplaces. Gloddaeth Hall again is the seat of the Mostyn family, and was altered by Eden Nesfield, and is a good subject. Also Gwydir House, Llanrwst, is well worth portions being sketched and measured. All these subjects would be of infinitely more use to "S. J." than Conway, although a very fine old castle.—Yours truly, C. O. N.

BRICK CARTAGE.

ARTICLES on cartage rates by various methods are to be published from time to time in the "Automobile Commercial Vehicle Review" (published at 21, Bride Lane, E.C.). The first gives the following particulars about the cartage of bricks which will doubtless be of interest to some of our readers:—

The great difficulty with brick haulage generally is the systematic neglect to build proper roads to the stacks or kilns. Where this is the case, much time, labour and money is lost in bad weather by the difficulties encountered in getting even a one-horse load on to the highway. No business-like contractor will accept a job at ordinary rates where he will not be able to take a full load, and whatever system of traction he uses it will suffer considerable damage by the strain involved in getting out of deep ruts. Of course, a liberal top dressing of mud is inseparable from a brickyard; all that is required is a good road foundation—something beyond which wheels will not sink. It is not so difficult to obtain a solid foundation on clay subsoils as is generally believed. Wet clay is always hungry, and will swallow any quantity of rubble and gravel it is fed with if a supporting medium for the metal is not used. By excavating the soil and depositing from 6in. to 8in. of metal above a layer of bush-bavins, or other similar material, a solid foundation is obtained. Telfer, the pioneer of good roads, built on this principle one of the soundest highways in Great Britain across a morass, thus accomplishing the seemingly impossible. The initial outlay may seem large, but it is as important to have good roads as to use economical kilns. The expenditure is soon returned by increased facility of transit, saving of material for repairs, and lower cartage rates. Where bricks are unloaded from railway wagons there should always be taken into consideration in fixing prices the risk of delay due to non-arrival of consignments.

Many large brickyard proprietors who undertake delivery, and contractors also, use the relay system of having carts or wagons loaded and unloaded whilst loads and empties are in transit. By this means no delay arises at either end. Where horses are employed on very short journeys, and under very favourable circumstances, it is found to work satisfactorily, but little is gained on long journeys. With light and heavy traction engines it is advisable in nearly every case. The system cannot, however, be worked to full advantage where motor lorries carrying a load are employed, because, although trailers can be dropped and picked up easily, some time is necessarily occupied in loading and unloading the body.

THE NEW GOVERNMENT BUILDINGS.

IT is now nearly three years since the new Local Government Board offices at the corner of Parliament Street and Parliament Square, and the new War Office building in Whitehall, were begun, and though still covered with scaffolding they are both sufficiently advanced to enable some idea of their general effect to be formed. At the former, the work under construction forms only part—rather more than half—of the complete block, as it will be eventually. It has a frontage of 320ft. on Parliament Street and extends back 570ft. along Charles Street. The superintending architect is Sir Henry Tanner, but the design is by the late Mr. J. M. Brydon. Mr. Ernest J. Searchfield is

into a vaulted hall, from which a marble staircase ascends to the first floor, where the audience room of the Local Government Board will be. This apartment, which will be used for receiving deputations, is 65ft. by 25ft. Similarly placed over the Charles Street entrance is the conference chamber. The new offices will be connected with the present Local Government Board offices by a bridge over Charles Street on the mezzanine floor. Some idea of the dimensions of the building may be gathered from the fact that there are three-quarters of a mile of corridors on each floor and over 7 miles of flues in the walls. It will not be ready for occupation for about three years, considerable delay having been caused by the Coronation. The present contract with Messrs. Spencer, Santo & Co. is for upwards of £400,000, which



NEW OFFICES FOR THE NORTH-EASTERN RAILWAY CO., COWLEY STREET, WESTMINSTER.
HORACE FIELD, ARCHITECT.

The front is to be built in red bricks of a special thin size, the stonework being Portland and the cornice of hardwood carved and painted. The Company will occupy these offices instead of their present premises in Great George Street. The drawing reproduced above is hung in this year's Academy.

clerk of the works, and Messrs. Spencer, Santo & Co. are the contractors. The building will consist of eight storeys, including basement and sub-basement, and will be about 7ft. lower than the adjoining block, in order to balance the Treasury building on the other side beyond Downing Street. Portland stone is being used for the exterior. The façade over the main entrance is ornamented with eight coupled columns of 3ft. in diameter, extending from the mezzanine floor to the entablature, with plain columns at equal intervals to right and left. A very striking feature of the interior is a spacious circular court, with a diameter of 164ft., and similarly ornamented with massive stone columns. The floors of the building are all of concrete with steel joists, and the stairs of York stone. The main entrance leads

does not include fittings, plumbing and plaster-work.

The new War Office building in Whitehall is somewhat more advanced. The roof is now being put on and the work will be completed in about two years. It occupies an island of irregular, but approximately rectangular, shape bounded by Whitehall, Whitehall Place, Whitehall Avenue and Horse Guards Avenue. The area is about $3\frac{3}{4}$ acres. The style is similar to that of the other building, but rather plainer, except for a number of ornamental groups representing Peace, War, Truth, Justice, &c., which will decorate the exterior. These are being moulded by Mr. Alfred Drury, A.R.A. The architect of the building was the late Mr. William Young, who, by a singular and unhappy coincidence, died about the same time

as Mr. Brydon. The present architects are Sir John Taylor and Mr. Clyde Young, the contractors being Messrs. Foster & Dicksee, of Rugby: their contract is for £447,000, but the whole cost of the building with fittings will amount to about £650,000. Mr. Woodward is clerk of the works.

R.I.B.A. EXAMINATIONS.

Pass List.

THE following are the results of the June examinations of the Royal Institute of British Architects:—

The Preliminary Examination, qualifying for Probationership R.I.B.A., was held in London and the under-mentioned provincial centres on June 7th and 8th. Of the total number of 251 entered, 58 were exempted from sitting, and the remaining 193 were examined with the following results:—

Centre.	Number Examined.	Passed.	Relegated.
London ..	84	61	23
Belfast ..	3	3	0
Birmingham ..	9	8	1
Bristol ..	12	10	2
Cardiff ..	9	5	4
Exeter ..	4	3	1
Glasgow ..	5	4	1
Liverpool ..	4	2	2
Leeds ..	24	18	6
Manchester ..	19	13	6
Newcastle ..	15	11	4
York ..	5	5	0
Total	193	143	50

The passed candidates, with those exempted—201 altogether—have been registered as probationers. They are:—

M. S. R. Adams (Chiswick)	F. J. Drake (Southsea)
A. D. Aitken (Airdrie)	W. B. Y. Draper (Kensington)
E. G. Allen (S. Woodford)	B. A. Dyer (Hereford)
Percy R. H. Allfree (Clerkenwell)	T. Eagar (Belfast)
J. D. Ashley (Bristol)	A. R. C. Eaton (Forest Gate, E.)
H. S. Badenoch (Newcastle-on-Tyne)	J. M. Fairweather (Dublin)
G. B. Baird (Glasgow)	J. H. Farrar (Leeds)
C. H. Baker (Kingston-on-Thames)	J. Farrell (Sydney, N.S.W.)
F. N. Bamford (Leytonstone)	G. R. Farrow (Clapham Park)
W. Barracough (Barnsley)	E. G. Filler (Caversham)
J. B. Barrow (Barrow-in-Furness)	F. H. Fitzgerald (Hither Green)
F. J. Barton (Bridgwater)	T. O. Foster (Ealing)
V. C. Batalha-Reis (Nottingham)	J. A. Fowler (Hastings)
V. P. Bausor (Cambridge)	F. B. Fulker (Salisbury)
V. Beer (Bristol)	I. V. Gibberd (Croydon)
S. G. Bentley (Farsley, near Leeds)	E. H. Gibson (Harrogate)
A. H. Birbeck (Hull)	G. Gifford (St. John's Wood, N.W.)
V. E. Birmingham (Margate)	W. Gill (Stanningley, near Leeds)
J. E. Bolam (Blaydon-on-Tyne)	W. M. Gillow (Alderley Edge, Cheshire)
T. H. Bolton (Leeds)	T. G. Gilmour (Glasgow)
C. G. Boucher (London, S.E.)	C. N. Glazebrook (Plymouth)
T. Braddock (Wimbledon)	H. Goldstraw (Hanley)
F. H. Brazier (Windsor)	C. Gorjon (Harrow-on-the-Hill)
R. B. Brierley (Bedford)	W. G. Gradon (Durham)
C. Bristow (West Norwood)	C. J. Graham (Chiswick)
A. G. Bryan (London, S.W.)	E. R. Green (Sydney, N.S.W.)
A. G. Bullock (New Southgate)	J. Grieve (Bradford)
J. E. Bullock (Clevedon)	C. F. Gurney (Leeds)
J. S. Burgess (Acton Hill, W.)	H. W. Hall (Liverpool)
F. T. Bush (Crouch Hill, N.)	C. E. Hanscombe (New Cross, S.E.)
C. H. Calvert (Nottingham)	F. M. Harker (Brighton)
J. Carey (Shepherd's Bush, W.)	W. H. Harrold (Alloa, N.B.)
H. Carter (Liphook, Hants)	A. W. Harwood (Highbury, N.)
A. J. H. Clarke (Dromore, co. Down)	S. T. Heath (Blackpool)
R. H. L. Cock (London, S.W.)	J. D. Henderson (Bewick-upon-Tweed)
C. R. Cole (Exeter)	W. T. Higgins (St. ny Stratford)
R. L. Collingwood (Richmond)	H. S. Higginson (Carlisle)
F. S. Cooper (Herne Bay)	S. Hirst (Huddersfield)
F. C. Core (Bayswater)	J. K. Hopkinson (Bury)
A. R. Cornwell (Hanley)	H. E. Horth (Hereford)
D. J. Corrigan (Elkin)	T. S. Hosking (Bristol)
L. V. Cousins (Taunton)	W. Howe (Barnsley)
C. D. Cox (Shepherd's Bush, W.)	W. Hoyle (Greenhithe)
T. H. Crawshaw (Barnsley)	E. L. F. Hunot (Lee, S.E.)
C. K. Crichton (Perth)	G. E. Hunter (Newcastle-on-Tyne)
R. Cromie (Lavender Hill, S.W.)	J. S. Huxley (Eastbourne)
J. A. Crush (Lavender Hill, S.W.)	W. J. Isaac (Warrington)
J. C. Davies (Morriston)	R. M. Isaacs (Sydney, N.S.W.)
H. D. Dawson (Faversham)	F. Jackson (Frimley)
W. F. Dawson (Leeds)	F. R. Jelley (Swansea)
W. R. Dawson (Halifax)	C. G. B. Kaye (Harpending)
J. L. Denman (Brighton)	J. V. Kershaw (Burnley)
I. Dixon (Liverpool)	F. E. Keymer (Great Yarmouth)
F. Donaldson (Bishop Auckland)	D. Kibbler (Stamford Hill)
	H. L. Kiddle (Tottenham, N.)

J. S. Koyvett (Birmingham)	W. H. Singer (Penarth)
E. Lamster (Darwen)	H. E. Smith (Birmingham)
A. L. Levy (Ladbroke Grove, W.)	R. F. Smith (Hull)
W. Lindsay (Glasgow)	R. G. Smith (Reading)
D. Longden (Glasgow)	J. H. Somerset (Manchester)
W. G. Lovell (Eastbourne)	A. W. Stabler (Shincliffe, near Durham)
A. V. Low (Paddington, W.)	A. A. Stamford (Cambridge)
J. G. N. Marchant (Mansfield)	A. W. Stelfox (Belfast)
H. H. Meadus (Rochester)	W. H. Stubington (Cranleigh)
H. I. Merriam (Kensington)	A. K. Sutcliffe (Ripley, Yorks)
K. H. Milne (Norfolk)	C. A. L. Sutton (Nottingham)
C. W. Mitchell (Southampton)	C. Swain (Buxton)
H. W. Mole (Newcastle-on-Tyne)	E. A. Taylor (North Sydney, N.S.W.)
H. Morley (South Kensington)	S. P. Taylor (Hanley)
F. E. S. Munt (Balham, S.W.)	G. Thomas (Sketty, R.S.O., Glam.)
F. A. Murray (Glasgow)	N. D. Thompson (Whyteleaf, Surrey)
S. A. Neave (Sydney, N.S.W.)	E. V. Todd (Blackpool)
C. J. Newbery (Bath)	N. Tom (Cardiff)
E. A. Nicholl-Garrett (Hereford)	J. W. Towers (Lytham)
W. Nicol (Blackburn)	A. Turnbull (Sunderland)
G. R. Oddy (Halifax)	F. L. Turnbull (Newcastle-on-Tyne)
G. Parker (Worcester)	W. T. Turner (Barnsley)
G. H. Parry (Upper Warlingham)	F. A. Vernon (West Dulwich, S.E.)
W. H. Pearson (Hull)	H. C. Walker (Ulverston)
V. H. Peart (Great Yarmouth)	A. R. Walton (Whitley Bay, R.S.O., Northumberland)
F. R. Priest (Clapham Common, S.W.)	F. D. Ward (Hastings)
F. A. M. Rawes (Exeter)	S. J. Ward (Northampton)
N. W. Read (Hampstead, N.W.)	F. C. Webster (Broughty Ferry)
P. Richards (Southampton)	W. R. Webster (Aberdeen)
H. T. Richardson (Birmingham)	A. Welford (Bromesbury, N.W.)
G. A. Richings (Clevedon)	R. H. Whiteing (Beverley)
W. W. Roberts (Maidenhead)	J. Whitelaw (Glasgow)
H. M. Robinson (Coventry)	N. Wigzell (Barnsley)
B. Robson (Scarborough)	J. Wilks (Stockton-on-Tees)
W. A. Rodger (Cardiff)	E. S. Williams (Taunton)
J. A. Rogers (West Hampstead)	J. H. Willman (Wellingborough)
C. H. Rose (Balham, S.W.)	R. S. Withere (Leicester)
H. Ross (B-lfist)	D. Wilson (Harpending)
H. A. Ross (Shepherd's Bush, W.)	R. Wilson (Lewisham, S.E.)
J. P. Salway (Reading)	W. H. Wilson (Sydney, N.S.W.)
R. T. Sault (Leicester)	G. C. Wingrove (Durham)
J. M. Scott (South Kensington)	G. W. Wintersgill (Middlesbrough)
E. D. Sherlock (Withington, Manchester)	A. S. Wood (South Kensington)
N. V. Shiels (Randwick, N.S.W.)	F. Worrow (Woodford)
C. H. Simpson (London, W.C.)	W. H. Wright (Battersea, S.W.)
	J. R. Young (Belfast)
	N. L. Young (Royton, near Oldham)

The Intermediate Examination.

qualifying for Studentship R.I.B.A., was held in London and the under-mentioned provincial centres on June 7th, 8th, 9th and 10th. One hundred and forty-three candidates were examined, with the following results:—

Centre.	Number examined.	Passed.	Relegated.
London ..	100	47	53
Belfast ..	2	1	1
Bristol ..	7	5	2
Glasgow ..	3	2	1
Leeds ..	13	10	3
Manchester ..	11	8	3
Newcastle ..	7	4	3
Total	143	77	66

The successful candidates, who have been registered as students, are as follows, the names being given in order of merit, as placed by the Board of Examiners:—

J. M. Smith (Chelsea, S.W.)	R. G. Spiller (Taunton)
R. W. Thorp (Leeds)	J. B. Surman (Birmingham)
H. B. Richards (Buttevant, co. Cork)	J. M. James (Weston-super-Mare)
J. J. Beck (Doncaster)	S. P. Smith (Leeds)
J. T. Penfold (Hammer-smith)	G. M. Stone (Tuxford, Notts)
B. Watson (North Shields)	A. A. Carder (Clapham Common)
V. Constable (Glasgow)	E. E. Hodder (Thornton Heath)
P. F. Warren (Norwich)	T. M. Bricknell (Shepherd's Bush)
C. H. Perkins (Wokingham)	H. A. Dalrymple (Ednburg)
H. Wormald (Leeds)	H. E. Adams (Brixton)
Q. H. Blumh (St. Anne's-on-the-Sea, Lanc.)	W. Baird (London, W.C.)
L. Blanc (Earl's Court)	J. B. Cubey (South Shields)
K. W. Matheson (Clapton)	H. B. Downs (Guisley)
H. A. Fairhead (E. field)	R. J. Tall (Gravesend)
T. H. Rhodes (Leeds)	G. B. Bridgman (London, N.W.)
C. C. Makins (Harrow)	G. M. Dunn (Cheapside)
J. W. Hepburn (London, S.W.)	C. M. Drewitt (Southport)
B. W. Oliver (Barnstaple)	W. H. Johnson (Great Yarmouth)
W. H. Riley (Leicester)	M. Thompson (Doncaster)
C. P. Wade (Yoxford, Suffolk)	F. Osler (London, S.E.)
G. Morland (Croydon)	M. E. Stahl (Weston-super-Mare)
J. R. Hobson (New Eltham, S.E.)	H. L. bown (Harrogate)
H. M. Spence (North Shields)	C. B. Smith (Ipswich)
R. C. Foster (Loughton)	W. A. Mackay (Ilford)
D. W. Clark (Twickenham)	G. W. Jarrett (Wandsworth Common)
H. G. Holt (Bolton)	
T. C. Marwick (Edinburgh)	

A. H. Kirk (London, S.W.)	C. J. Hazard (Stoke Newington)
W. Sutcliffe (Tadmorden)	S. T. Hennell (Wandsworth Common)
B. C. Hill (Bristol)	H. D. Hird (Halifax)
E. B. Crossley (Nottingham)	E. A. Jackson (Wd. Grn.), N.
D. M. Addis (Edinburgh)	N. Jones (Southport)
W. J. Brough (London, N.)	J. N. Keasley (Redhill)
W. W. J. Calthrop (Farncombe)	F. W. Langman (Notting Hill, W.)
H. Carnelley (Barnsley)	T. S. Lello (Goodmayes)
W. T. Clarke (Liverpool)	P. Minor (Manchester)
J. O. Cook (Preston)	A. Purslove (St. Helen's)
B. K. Gribbon (Leeds)	W. C. B. Sinclair (Bexley)
R. F. Gutteridge (Southampton)	B. C. Westwick (Mansfield)
A. H. Hasnip (Hastings)	

The Final and Special Examinations, qualifying for candidature as Associate R.I.B.A., were held in London from June 24th to 30th. Of the sixty-seven candidates admitted, thirty-two passed, and thirty-five were relegated in certain subjects. The following are the names of the passed candidates, the † prefixed to a name signifying that the candidate passed the Special Examination designed for candidates exempted by resolution of the Council from the Preliminary and Intermediate examinations and from submitting Testimonies of Study:—

E. G. Allen (Croydon)	A. H. Gloyne (Richmond, Surrey)
† R. J. Allison (Honor Oak Park, S.E.)	H. P. Gordon (Harrow-on-the-Hill)
W. H. Bagot (Portland Place, W.)	P. W. Hawkins (Beckenham)
W. J. Ball (Warrington)	V. B. Hooper (Brixton)
E. Bates (East Croydon)	V. Hooper (Redhill)
C. Batley (Ipswich)	P. C. Pilling (Bolton)
W. E. A. Brown (Camberwell, S.E.)	K. D. S. Robinson (Westminster)
A. N. Campbell (Hampton-on-Thames)	† G. A. Ross (Montreal)
C. M. Childs (Highgate Road, N.W.)	T. T. Sawday (Leicester)
B. C. Chilwell (Wendesbury)	A. Scott (Glasgow)
C. B. Cleveland (Earl's Court)	N. O. Searle (London, E.C.)
† J. C. Cook (Cape Town)	R. E. Stewardson (Upper Tooting)
N. Culley (Huddersfield)	F. E. Stratton (Upper Mitcham)
† S. C. Curtis (Bloomsbury)	P. J. Westwood (London S.W.)
W. T. Curtis (West Dulwich)	† G. H. Widdows (Derby)
W. J. Davies (Sidcup)	F. Wilson (Sheffield)

The following shows the number of failures in each subject of the Final:—

I. Design ..	20
II. Mouldings, &c. ..	33
III. Materials ..	20
IV. Sanitation ..	14
V. Specifications ..	17
VII. Construction: Foundations, Walls, &c. ..	9
VII. Construction: Iron and Steel, &c. ..	22

Law Cases.

Edinburgh Architects' Claim for Fees.—Messrs. Simon & Crawford, architects, of Edinburgh, recently brought an action against Mr. J. S. Saunders, an Edinburgh solicitor, for £97 13s. in respect of certain plans prepared, being at the rate of 3 per cent. on the estimated cost, plus certain additional fees. The defence was that the architects undertook to prepare plans of a double villa to cost not more than £3,000, afterwards increased to £3,200, the defendant having shown them a semi-villa which he thought of purchasing at the price of £1,500. An estimate was got by the architects from a firm of builders for the mason and other works, amounting to £3,373, and the additional cost of fittings, &c., brought the estimated cost to over £4,000. The defendant alleged that he was satisfied the architects could not fulfil their contract to erect the villas for £3,000. He accordingly abandoned the idea.—Judgment for plaintiffs for £50 and two-thirds of their expenses.

An Architectural Novelty in St. Petersburg.—During the current building season in one of the central parts of St. Petersburg it is proposed to construct a hitherto unknown kind of façade in Russia, consisting exclusively of ceramic ware. This will be the first instance in Russia of a tiled façade. Hitherto ceramic ware has only been used for ornamentation. It remains to be seen how the tiles will stand the sharp changes of climate.

Bricks and Mortar.

Aphorism for the Week.

The present century has no school of art but such as each man of talent or genius makes for himself. —WILLIAM MORRIS.

Our Plates.

SHAWFORD DOWN CHURCH, Winchester, will consist of a nave and aisles, south chancel aisle, with an organ chamber on the north side, and when completed will accommodate 450 worshippers. The vestries are placed at the west end, with a heating chamber beneath them. The tower will stand at the north-west corner of the building, but this, together with the north aisle, will probably be omitted at first. The walls externally will be faced with flints, and Bath or similar stone will be employed for the windows, quoins, mullions, strings, copings, &c. The walls internally will be plastered, while Bath or similar stone will also be used for the piers, arches, quoins, &c. The site, abutting on the Shawford golf links, is a very fine one, and the church when erected will be visible for many miles. The architect is Mr. Charles J. Blomfield, of 6, Montagu Place, Baker Street, W.—We are unable to obtain any

particulars or a plan of the house at Rugby by Mr. Simpson.

A Doomed City Church.

As there is no opposition to the scheme of the Bishop of London for demolishing the church of St. Peter-le-Poor, Broad Street, it is probable this little Georgian edifice will be razed to the ground. Unlike the church of St. Mary Aldermanbury, which was threatened by the Bishop a short time ago, St. Peter-le-Poor has no striking features to recommend it for protection. It has no interesting historical associations; it is not a beautiful church; it is not an old church; it was not built by Wren; and finally it is not even a useful church. In fact, the building has one, and only one, claim upon our regard—it is one of the very few completely round churches in the kingdom, and probably the only round church built so late as the eighteenth century. The original church of St. Peter-le-Poor which escaped destruction in the Great Fire of 1666 was demolished in 1788, and in its place rose the present building, finished in 1792. The circular plan has given the church very peculiar advantages from an acoustic point of view, and the effect of music in it is remarkable. Perhaps

its removal may prove to be one of the most interesting episodes in its history. As rebuilt, St. Peter's stands partly on the site of the choir of the great priory church of the Augustinian Friars. Its removal may lay bare the foundations of its once glorious neighbour, and result in the discovery of the exact dimensions and site of the transepts, choir and cloister of the priory. Certain demolitions of houses in the immediate neighbourhood in 1896 enabled the positions of these parts of the building to be tentatively located, but the removal of St. Peter's may place the matter beyond doubt.

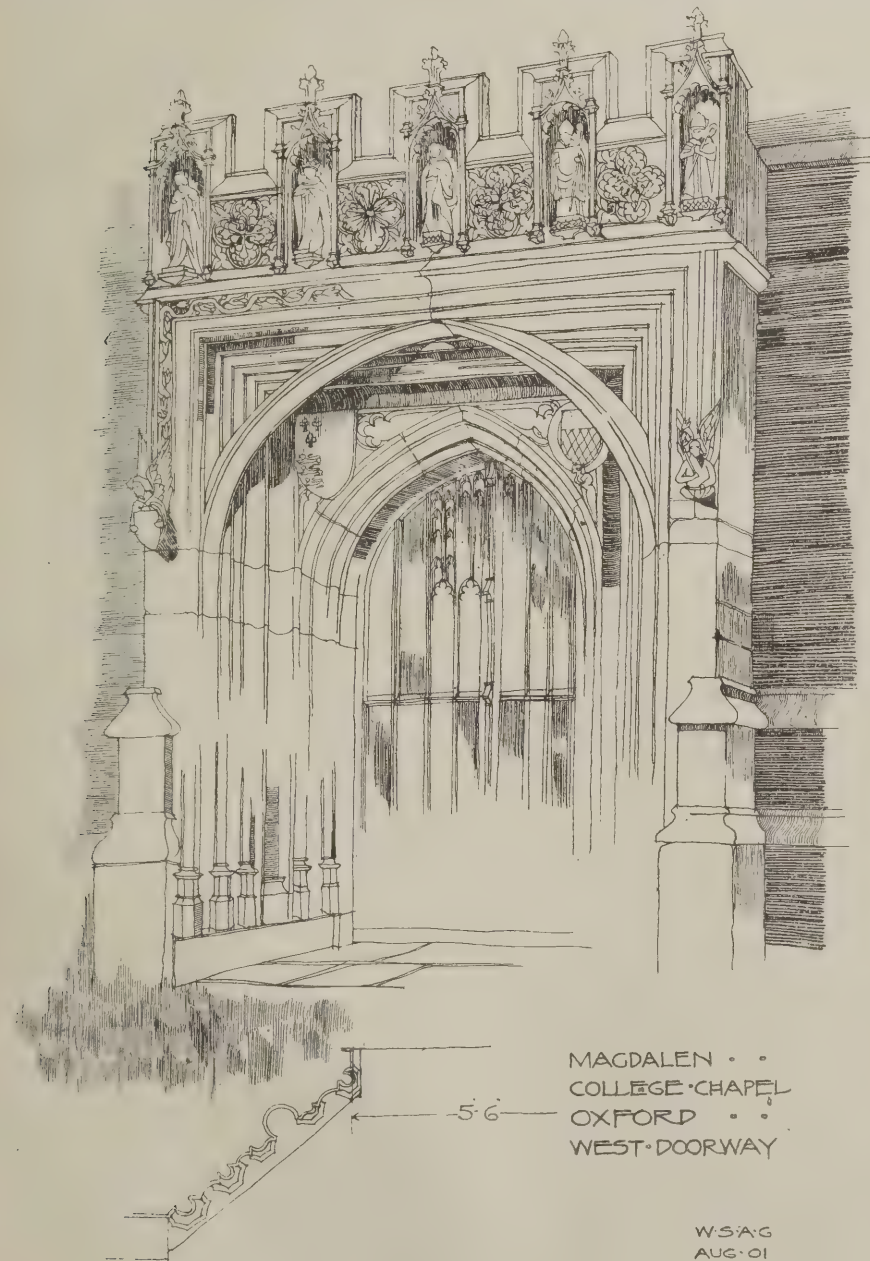
Miss Marie Corelli on Restoration.

MISS CORELLI, who is much interested in the antiquities of the country, writes thus about restoration in an article on the clergy in the current number of the "Bystander": "There are funds of other mettle than for the sick and poor—'restoration' funds especially. For many years a famous church was in debt owing to restorations, and Sunday after Sunday the vicar implored his congregation to lift the burden off its time-honoured walls—in vain. At last one parishioner paid the amount required in full. The vicar acknowledged the cheque—put a recording line in the parish magazine—and for more than a year did not speak to that parishioner again!"

The new Victoria Station. IN connection with the work now in progress for enlarging Victoria Station, the London, Brighton and South Coast Railway intend to construct over the booking-office block an annexe to the Grosvenor Hotel, in the Renaissance style, the material used in the main front to be Portland stone relieved with red bricks. The ground floor will be reserved for station purposes, and there will be new waiting-rooms and a new booking-hall 120ft. by 70ft. The foundations for the annexe are already complete, and preparations are now being made for the erection of the steel framework which will form the lower part of the building. The eight additional acres of land acquired by the company have all been cleared, and the new station and boundary wall in Buckingham Palace Road are practically completed. The bridge for carrying Elisabeth Street over the existing and widened lines is nearly finished, and the raising of Buckingham Palace Road will shortly be taken in hand, while a commencement will soon be made with the new roof, which is to be made up of comparatively small spans, with the idea of facilitating future maintenance. The whole of the works have been designed under the supervision of Mr. Charles L. Morgan, the company's engineer.

Royal Horticultural Society's New Hall.

THE new hall and offices of the Royal Horticultural Society, opened by the King on Friday, have been erected in Vincent Square, Westminster, at a cost of nearly £40,000. Mr. Edwin Stubbs is the architect. The exhibition hall measures 142ft. by 75ft., and, with the two annexes opening into it, each 47ft. by 24ft., gives a total floor-space of nearly 13,000 ft. super. The roof is of glass, and the annexes are lighted from it and by large round-headed windows on the ground floor. The lecture room occupies the whole of the east wing on the first floor of the front building, while in the west wing on the same floor are three committee rooms. The east wing of the second floor will be devoted to the administrative work of the society. This includes the council room, secretary's and clerks' offices, waiting-room, &c. In the west wing of the second floor will be housed the library of the society, with which is included the incomparable collection of horticultural works known as the "Lindley Library."



MAGDALEN . .
COLLEGE CHAPEL
OXFORD . .
WEST DOORWAY

W.S.A.G.
AUG. 01

DRAWN BY W. S. A. GORDON.

The west doorway to this chapel is in the old quadrangle of St. John Baptist (1471-1485). The figures in niches represent St. John, St. Mary Magdalene, St. Swithin, Edward IV. and the founder, William Patten.

Keystones.

George Eliot's House at Wandsworth—Holly Lodge, Wimbledon Park Road—is to be commemorated by a memorial tablet.

Wolverhampton's new Workhouse has cost £186,910—this comprising £11,128 for the site and £175,782 for the buildings and equipment.

Woolwich Tunnel.—The proposal to construct a footway tunnel under the Thames at Woolwich, at an estimated cost of £145,000, has been rejected by the London County Council.

The new Church of St. John the Baptist, Greenhill, Harrow, has been built from the designs of Mr. J. S. Alder. It is of stone in the Decorated Gothic style. Seating accommodation is provided for 900 worshippers.

The Liverpool Cathedral Fund now stands at £199,000. Of this sum £30,000 has been paid away for the site and legal expenses, leaving £169,000 towards the cost of the first portion of the building, which is estimated at £240,000; so that £71,000 is still required.

Long Eaton Free Library Competition.—Five sets of plans were sent in for this competition, which was limited to local architects. The first premium of £25 has been awarded to Messrs. Gorman & Ross; the second (£15) to Mr. Reginald Smith; and the third (£10) to Mr. W. H. Woods. The cost of the library will be about £3,000.

The Council of the Royal Academy, to which attention is now drawn by the Chantrey enquiry, is composed of Mr. Bodley and Mr. Aston Webb, among architects; by Mr. Frampton, alone among sculptors; and by the following painters, Mr. Yeames, Mr. Waterhouse, Sir Laurence Alma-Tadema, Sir Ernest Waterlow, Mr. Macbeth, Mr. Fildes and Mr. Stone; and of course the president, Sir E. J. Poynter.

Birmingham Soldiers' Memorial.—The design of Mr. Albert Toft has been chosen out of eight others for the memorial proposed to be placed in Cannon Hill Park, Birmingham, in memory of the local men who fell in the Boer War. It takes the form of a central pedestal with projections at the four corners, surmounted by a bronze group 6ft. 6in. high, representing Victory or Peace resting with one hand on a shield, while the other holds a wreath with which she crowns two soldiers, typifying Courage and Endurance. On the front face of the pedestal are two bas-relief figures representing Sympathy and Grief, and on the other three sides are large bronze panels bearing the names of the dead men. The total height of the memorial will be about 25ft. It is proposed to be carried out in Hopton Wood stone, with granite steps. The cost will be £2,000.

The Strand Island Sites were put up to auction again on July 19th, but no sale was effected. At last week's meeting of the London County Council Mr. Davies (chairman of the Improvement Committee) said the only complaint he had heard was that the lease was so short that people did not feel justified in expending on the buildings the large sums of money which the Council stipulated. "The committee," he added, "will consider whether it will not recommend the Council to extend the lease from eighty to ninety-nine years. But the present terms are not more onerous than the ground landlords generally impose. The difficulty is that the Council is fortunate enough to possess officers who see that these conditions are enforced perhaps more strictly than is done by the officers and architects engaged by the ground landlords."

Roofed Tramcars will be running on the L.C.C. Peckham tramway in October.

Turkish Baths for Plymouth are proposed. Plans have been prepared by Mr. A. S. Parker, A.R.I.B.A.

Waddington Hall, near Clitheroe, formerly used as a barn, has been restored to what is believed to have been its original form.

A Memorial Window to Dean Farrar has been erected in St. John's Church, Hoxton, from designs by Mr. J. A. Reeve. The work was executed by Messrs. Campbell & Christmas, of West Brompton.

The Electric Tramways at Northampton were inaugurated last week. The corporation purchased the system from a local company for £37,500 and converted it from a horse-drawn to an electric system at an additional cost of £85,000.

A Memorial to the Coldstream Guards who fell in South Africa was unveiled last week in St. Paul's Cathedral. It faces the Inkerman memorial, near the south-west door, and is the work of Mr. Goscombe John, A.R.A. The memorial takes the form of a bronze relief.

Changes of Address.—Mr. E. Stanley Mitton, architect, has removed from Oxford Road, Moseley, to 11, Ocean Chambers, Waterloo Street, Birmingham.—Messrs. Pearson Brothers & Campbell and Messrs. The Hydraulic Brick and Stone Co., Ltd., have removed to 18, Water Street, Liverpool.

Three Sedilia in Oak have been placed on the north side of the chancel of Winchester College Chapel in memory of the late Rev. Godfrey Bolles Lee, the last warden of the college. The design has been copied from the fifteenth-century miserere seats of the choir, the only woodwork now remaining in the chapel. Mr. G. H. Kitchin, son of Dean Kitchin, was the architect.

A new London Synagogue.—The foundation-stone of the new South-East London Associate Synagogue, to be erected on the Fairlawn estate, New Cross Road, was laid recently. The building has been designed by Mr. Delissa Joseph, F.R.I.B.A., and will afford accommodation for 200 male and 150 female members. The total cost, including classrooms, is estimated at £5,000. The building is of Romanesque design and will be of red bricks with stone dressings. At the rear of the synagogue will be the classrooms, divided by sliding partitions.

No. 17, Fleet Street.—A dispute has arisen between the City Corporation and the Benchers of the Middle Temple as to this house, popularly known as "Wolsey's Palace." The renovation scheme involves moving one gateway of the Middle Temple, which is underneath one side of the house. The Corporation claim the subsoil rights and the Benchers dispute the claim. It will be remembered the London County Council agreed to purchase the building for £27,000, and that the present dummy front was to be taken down, exposing the real half-timber front behind. When this will be done, however, now seems quite indefinite.

The new Thoroughfare to Trafalgar Square.—In about a week's time the demolition of all the property on the north side of Spring Gardens, recently occupied as offices by various Admiralty departments, and two contiguous commercial houses in Charing Cross, will be commenced. Until the end of the reign of George II. the mansions there were occupied by many notable persons. Among the buildings scheduled to come down is the old chapel at the corner of New Street and Spring Gardens, built about 1735. Divine service has not been held in the chapel for many years, and recently it has been used as a joiner's shop by workmen employed by the Office of Works.

Armagh Cathedral was consecrated on Sunday and reopened.

A new Pavilion at Bridlington, on Prince's Parade, is to be built, to accommodate 2,500 people.

A new Fire Station at Kensington is being erected in Clarence Mews, High Street. The site cost £8,453, and £10,980 will be needed for the building.

New Police Buildings at Sedgley have been erected at a cost of about £3,000, from designs prepared by Mr. W. H. Cheadle, county surveyor. Mr. H. Gough, of Wolverhampton, was the builder.

Leeds Castle, near Maidstone.—The most interesting portions of this building (for more than 250 years a royal residence) are open to the public to-day—this opportunity being granted only once a year.

New Oak Vaulting has been erected in the tower lantern of Crewkerne Church. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter, from designs by Mr. Howard Gaye, architect, of London.

All Saints' Church, Fishponds, Bristol, is being erected in Grove Road from designs by Messrs. Lingen, Barker & Son, of Bristol. The builders are Messrs. Clark & Son and the estimated cost is £3,000.

The Academy.—According to custom, the Royal Academy is open this week—the last of the season—during the evenings at the reduced charge of 6d.; it will also be half-price all day on Bank Holiday. The price of the catalogue is also reduced from 1s. to 6d.

A new Hotel at Hunstanton has been built on the site of the ancient hostelry known as Le Strange Arms. The architect was Mr. Herbert J. Green, of Norwich and Lynn, the contractor being Mr. J. Cracknell, of Peterborough.

A new Boys' School at Oxford is being erected in connection with St. Frideswide's Church at an estimated cost of £3,500. Messrs. Tollit & Lee, of Oxford, are the architects. Accommodation will be provided for 274 boys, one long room, 8ft. by 22ft., being divided by partitions to form classrooms, each accommodating fifty-six scholars, with two other classrooms.

The Suggested Board of Defence.—Commenting on the Board of Defence proposed to be formed by the R.I.B.A., the "American Architect" says: "It is rather surprising to find this matter of mutual protection, which has been brought into successful operation by the Société Centrale des Architectes Français, taken up in England before we in America have seen fit to do so. The Briton is a little apt to think that nothing good can come out of Gaul, while Americans, on the other hand, are prone to think that, where architecture is concerned in any way, a French model is the best to follow."

Eton Memorial Competition.—The Committee of Taste and Design—of which Lord Windsor is chairman—appointed to receive plans for the new hall, library and museum to be erected at Eton as a memorial to Old Etonians who fell in South Africa have received sets of plans and designs from sixteen Old Etonian architects. The assessor, Mr. R. Norman Shaw, R.A., has made the following awards:—1st (£100), Mr. L. K. Hall; 2nd (£75), Mr. Francis Mount (Messrs. Eden & Mount); 3rd (£25), Mr. Ambrose Poynter—all of London. The committee are not yet in a position to make any further statement on the matter or to suggest the adoption of any one design, or the combination of two or more designs, but they hope to be able to come to a decision in the autumn. The designs are on exhibition at the rooms of the Society of Antiquaries in Burlington House, Piccadilly, from 10.30 to 5 up to (and including) July 30th and from 10.30 to 3.30 between August 1st and 6th.

Views and Reviews.

Armoured Concrete.

Armoured, ferro or reinforced concrete is a type of construction elaborated so recently, and has risen to such importance within the last few years, that we welcome any scientific notes on the principles and practice of this branch of building construction. It is natural that there should be a dearth of literature altogether disproportionate to the importance of the subject, and we are compelled to go to the French, the originators of this system of building, for thorough treatises. The mass of information available, the many investigations that have been made, and the fact that the study of steel and concrete in combination is advancing continually, necessitate that theoretical treatises shall succeed each other rapidly. These notes by Major Winn are compiled for the assistance of brother officers of the Royal Engineer corps, and are admittedly only a summary of such large books as M. Paul Christophe's "Le Béton Armé," but the pamphlet will nevertheless be very useful to all architects and engineers in this country who have not the opportunity to study and consult the French works. The illustrations are just what they should be, and the notes are very clearly written, the subject being treated from a thoroughly practical standpoint, which is noteworthy when it is remembered how numerous are the systems and forms of armoured concrete construction which seem all right theoretically but are impossible of application by the class of labour available in the building trades of this country.

"Notes on Steel Concrete Construction," by Major J. Winn, R.E. Chatham: The Royal Engineers' Institute. Agents: W. & J. Mackay & Co., Ltd., 176, High Street, Chatham, price 2s. 6d. nett.

Bayeux Cathedral.

It sometimes happens that the introduction to a book gives the best possible summary of its contents. It is so with this one, and we cannot do better than extract the following from it: "Now Bayeux Cathedral also contains Norman and Gothic work, and presents this same contrast on a large scale. But the charming combination of the two styles is so managed that a sense of harmony rather than of unpleasant contrast is produced. In fact, the combination is in this instance so beautiful in every way that in gazing there-upon a deep sense of spiritual repose is shed over the soul of man. Herein lies the special excellence of the grand interior of Bayeux Cathedral. There are more magnificent churches in France, planned and built on a larger scale; there are churches which are more perfect exponents of the best Gothic style; but surely there are none in which the two great styles of French architecture are more gracefully blended. . . . To my mind this beautiful and striking characteristic of Bayeux Cathedral is a complete set-off to the slight feeling of disappointment felt on discovering that so small a portion of the existing sacred edifice can be really attributed to the days of Bishop Odo and the reign of King William the Conqueror." From this it will be seen that the author deals with his subject from a personal standpoint, and not that of the ordinary guide-book. Turning to the illustration on this page, it is interesting to note the lofty cupola and fleche that rise from the low central tower. "From this point of view, excellent as it is, no one would dream that Bayeux

was in any sense a Norman cathedral. You see almost entirely thirteenth-century work, as good of its kind as you will see anywhere in France. Yet not all thirteenth-century work, for the present cupola and fleche were added in the nineteenth century, and form the least satisfactory part of the cathedral."

The book is well illustrated, and will be read with much interest and instruction.

"The Cathedral Church of Bayeux and other Historical Relics in its Neighbourhood," by the Rev. R. S. Mylne. London: George Bell & Sons, price 2s. 6d. nett.

Smithery.

This book is not concerned with the art of the blacksmith, but deals with the subject purely from the practical technical workmanship side. It is remarkably thorough, very clearly written, and well arranged, the illustrations being also most satisfactory. The chapters are as follows:—The smithy and appliances, tools, forging wrought iron, adjusting surfaces and bolts and rivets, steel, hardening and tempering steel, the chisel, bench work, and coach smithing. Many



BAYEUX CATHEDRAL FROM THE EAST.

other applications of blacksmith's work than in the building trade are dealt with. The book is full of useful particulars, collected together under side headings, and should prove of much value both to the architect and the building trade operative.

"Notes on Blacksmith's Work," by Major R. F. Sorsbie, R.E. Chatham: The Royal Engineers' Institute. Agents: W. & J. Mackie & Co., Ltd., 176, High Street, Chatham, price 4s. 6d.

School Lighting.

There can be no doubt that more attention needs to be given to the scientific lighting of schoolrooms in their bearing upon the eyesight and health of children. It has been established that a great deal of the near-sightedness (myopia) that has so increased of late years is due to the insufficient lighting in which children have to work, the weakness being developed from the seventh to the twelfth years of age, while the tissues are still tender and yield readily under the protracted strain of schoolwork. We agree with the author that, while much attention has been paid to the sanitation

and ventilation of schools, no proportionate amount of attention has been given to the proper lighting of schoolrooms. The author admits that architects are not to blame in this respect, his endeavours being to urge school authorities to recognize the importance of lighting and to support and inspire architects to greater efforts. The examples of schools illustrated are all American, but the author has consulted numerous outside authorities, such as Robson, and German books, and his generalizations are fairly trustworthy. Perhaps the most important part of the book is that devoted to the choice of a site; in this it is urged that the character of surrounding buildings should be carefully considered; as a rule neighbouring buildings, trees or other obstructions should be distant not less than twice their height from a school building; if the ground-floor rooms are to be used for children to work in. The author describes the forms of plans giving the best lighting, the position, size and shape of windows and their details, blinds, the placing of desks, &c. His language is clear, and if he claims perhaps too much importance for his subject it is a good fault in an advocate of reform.

"The Lighting of School-rooms: A manual for School Boards, Architects, Superintendents and Teachers," by Stuart H. Rowe, Ph.D. London: Longmans, Green & Co., price 3s. 6d. nett.

Fires and Explosions.

This book is written primarily for the use of fire-insurance officials, fire-brigade officers, members of the legal profession, law officers, factory inspectors and owners, and local authorities, and sets out to be a popular guide to the chemical aspect of the degree of fire risk, the possibility and means of prevention, incendiarism and the causes of fires, as well as to extend the general knowledge of fire risk of chemico-technical substances and processes to those who have no previous acquaintance with the subject. The purpose is well fulfilled. The book serves alike for reference and for the student, though it cannot be considered a thorough treatise. The prevention and resistance of fire is an important subject to the architect and engineer, and there is much in this book that will be found of service by them. The chapters on dangers caused by sources of light and heat, and dangers in various establishments, such as drug stores, laboratories, chemical factories, sugar works, breweries, soap and candle works, &c., and on fireproofing, are especially interesting and instructive. There is also a useful appendix giving tables, lists of substances and their properties, &c. Like most German technical works, the book is concise in its language and methodically arranged. The translation is fairly well done.

"Fire and Explosion Risks: A handbook dealing with the detection, investigation and prevention of dangers arising from fires and explosions of chemico-technical substances and establishments," by Dr. Von Schwartz, translated from the revised German edition by Charles T. C. Salter. London: Charles Griffin & Co., Ltd., price 16s. nett.

Structural Engineering.

This is a very able work on the theory of structures for students of this branch of engineering. It is clearly written, concise, and is illustrated far better than the generality of such books. Commencing with the principles of graphic statics, the author goes on to discuss stresses and strains, bending moments, moments of inertia, girders and beams, masonry structures, columns and struts, concluding with short chapters on bridges and torsion. Many exercises for

students are introduced, evidently with the particular object of serving as a class-book. The treatment of the subject is not too abstrusely mathematical, and we feel able to commend the work to students of engineering possessing an elementary knowledge of mathematics and mechanics. As a rule, reliable books are too difficult for the majority of those entering the architectural and engineering professions, while the books written in a simple manner are unreliable, appearing to be by authors who are not practical men, having but a smattering of the subject. Yet this book is not faultless, for, like most works on the subject of structures, the treatment of the stability of roof-trusses, walls, chimneys, buttresses and other branches of architectural design is scanty; and it does not deal with those very points in regard to which the practising architect as a rule requires enlightenment.

"Strength and Elasticity of Structural Members," by R. J. Woods, M.E., M.I.C.E. London: Edward Arnold, 37, Bedford Street, Strand, W.C., price 10s. 6d. nett.

Molesworth's Pocket-Book.

At this stage it would be superfluous for us to enlarge upon the usefulness and importance of this work to the engineering profession. The fact that twenty-five editions have been issued prove it to be a standard work and an indispensable part of an engineer's equipment. The authors and publishers are fully alive to the importance of keeping it up to date in every respect, and each edition shows an advance. The edition now before us has been adequately revised and a number of additions made. In particular we may mention that the electrical supplement has been thoroughly revised and rewritten by Mr. Walter H. Molesworth.

"Pocket-book of Useful Formulæ and Memoranda for Civil and Mechanical Engineers," by Sir Guildford L. Molesworth, K.C.I.E., President I.C.E., &c., and Henry Bridges Molesworth, M.I.C.E. London: E. & F. N. Spon, Ltd., 125, Strand, W.C., price 6s.

Technics.

The first volume of this new monthly issued by Messrs. George Newnes is now before us. It is a magazine for technical students, and as such contains articles dealing with most branches of science and industry: more especially, however, we notice articles on "Charlottenburg" (the Berlin technical high school), the new chemical laboratories at the Royal College of Science, London, the heating and ventilation of an educational building, vectors and graphs and their practical appli-

cations, the planning, setting-out and making of staircases, potters' materials, structural design, and present-day mural decoration. The articles are well illustrated, chiefly by photographs. We rather doubt, however, the good policy of running a series through such a publication, as it is apt to give somewhat of a sameness to the several numbers.

"Technics," Vol. 1. London: George Newnes, Ltd., price 7s. 6d. nett.

"FALSE RAIL" VENTILATION.

By B. WYAND.

ONE of the simplest and best means of ventilating a room is to substitute a "false rail" for that portion of the inside bead which abuts against the bottom rail of the lower sash of a double-hung window. Fig. 1 gives a section through a box-framed or double-hung window provided with the ordinary inside bead (a) and with sashes closed, whilst Fig. 2. gives the same section with the substitution of a false rail (b). Fig. 3 shows the lower sash lifted about 3in., the open portion being protected from an inrush of air by the abutting false rail (b). Arrows mark the course of the fresh air admitted through the meeting rails. Easy and inexpensive of application as this is, it secures excellent ventilation without draught. It is a practical application of the well-known Tobin tube (Fig. 4), the fresh air entering the apartment at about the same level; the only real difference being that in the case of the tube the fresh air enters by means of a ventilator fixed in the outer wall, and traverses the tube before entering the room. What is claimed for the Tobin tube—"that the fresh air rises in a smooth stream, clinging, as it were, to the wall, and scarcely changing its direction until it has passed far above the level of the opening"—may be claimed also for this false-rail system. With the top sash lowered a couple of inches, inlet and outlet ventilation may be obtained, the constant current of fresh air flowing upwards through the meeting rails removing the lighter vitiated air, but of course there will always be a certain amount of down-draught from this top opening and a complexity of currents and eddies. A rough-and-ready mode of false-rail ventilation is shown by dotted lines

(c) in Fig. 3, consisting of a movable length of batten inserted in the open portion of the window, upon which the lower rail shuts down.

Builders' Notes.

The Clifton Street Schools, Swindon, have been supplied by Messrs. E. H. Shorland & Brother, of Manchester, with some more of their patent Manchester grates.

The Health Exhibition in connection with the Sanitary Institute Congress at Glasgow was opened on Thursday by Sir John Ure Primrose, Lord Provost of Glasgow. Over 100 of the leading sanitary firms of this and other countries are represented.

American Engineering Methods.—At a meeting of the Institution of Mechanical Engineers held on Friday last Mr. Spencer said with regard to the iron and steel trade of America he had seen nothing to excel the best established works in this country, but what he had noticed was the spirited manner in which machinery was laid down to cope with enormous outputs. The energy with which everyone worked in America, whether as manager or workman, formed another subject for serious reflection. Many of the workmen he had noticed had gone over from England, feeling all progress barred to them in this country. For this our trade unions were largely responsible.

Birmingham's Welsh Water-Supply.—The whole of the cement used in the construction of the dams in the Elan valley (91,000 tons) has been supplied from works formerly owned by J. Bazley White & Brothers, and now the property of the Associated Portland Cement Manufacturers (1900), Ltd. Also, the 31,000 tons used in constructing the great storage reservoir and filter beds at Frankley, near Birmingham, forming portion of the same undertaking, were supplied from the Arlesley Works, formerly owned by the Arlesley Portland Cement Co., and now belonging to the Associated Manufacturers. Remembering what has been frequently stated concerning the inroads of foreign cement, it is instructive to know that only cement of British manufacture has been used for these extensive water-supply works (of which some further particulars were given on p. 35 of our issue for last week).

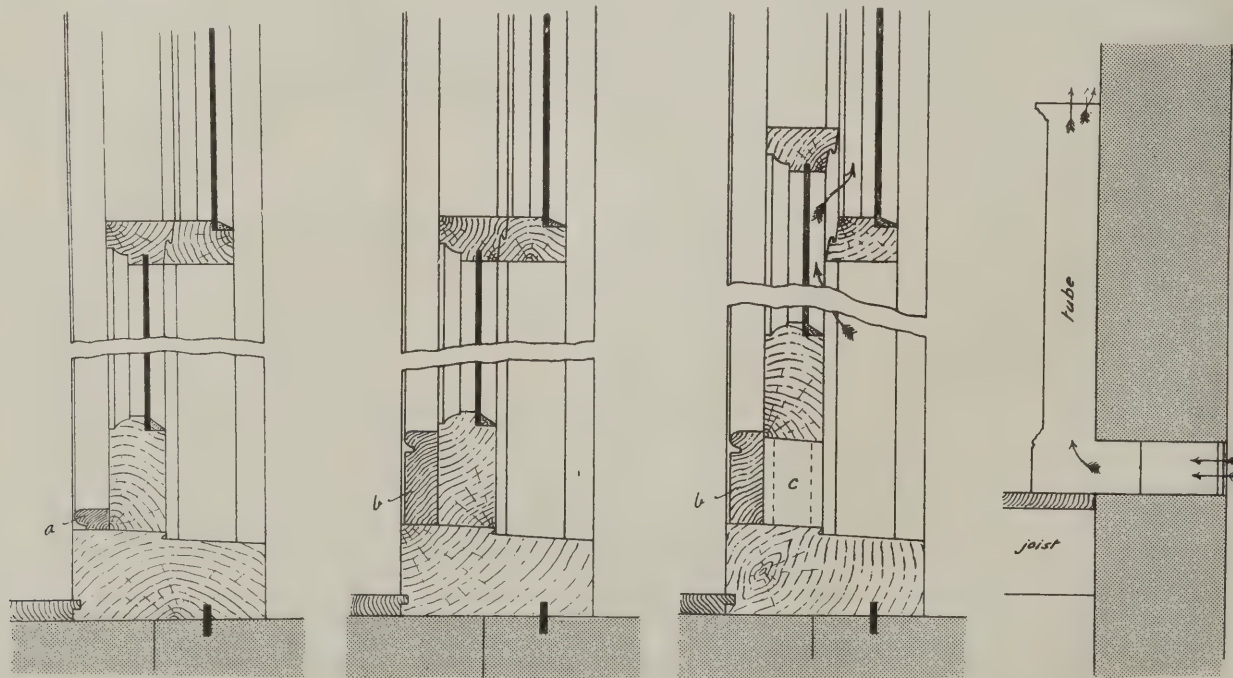


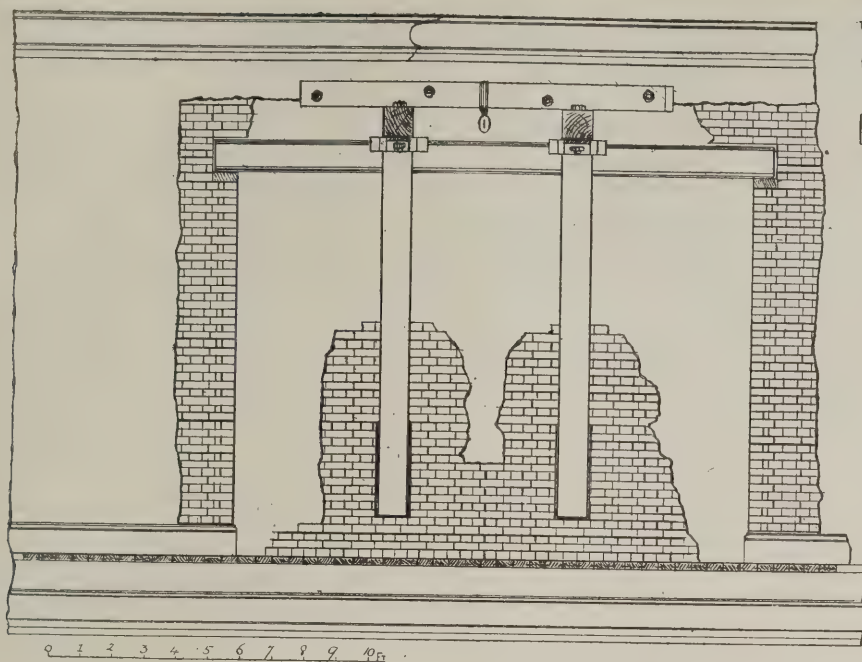
FIG. 1.

FIG. 2.

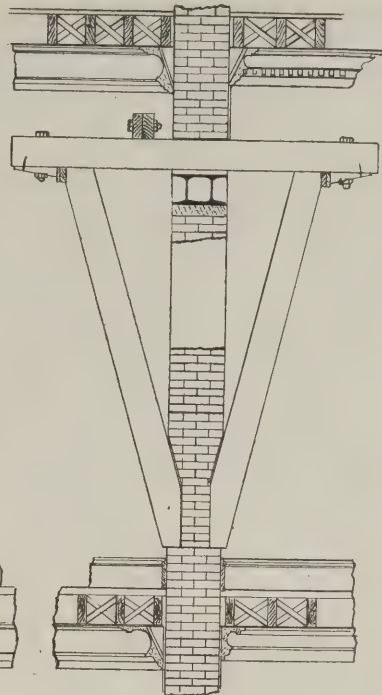
FIG. 3.

FIG. 4.

FALSE-RAIL VENTILATION.



UNDERPINNING PARTY WALL.



R.I.B.A. NOTES.

SIR ISAMBARD OWEN, M.D., and Prof. Elsey Smith, representing respectively the University College of South Wales and Monmouthshire, and King's College, London, have been appointed members of the Board of Architectural Education.

The annual dinner will be held at Newcastle-on-Tyne on Friday, October 7th.

Members will be welcomed on their arrival at Newcastle on Thursday evening, October 6th, by an influential local committee at the County Hotel, Newcastle, which will be the headquarters of the Institute during the visit. On Friday the Mayor (Mr. Alderman A. P. Anderson) will receive the members at the Council Chamber at 10 a.m., and deliver an address of welcome on behalf of the city of Newcastle. The members will then adjourn to the lecture theatre of the North of England Institute of Mining and Mechanical Engineers, where the president of the Institute will take the chair, for the purpose of a conference on matters of interest to the profession. St. Nicholas's Church and Trinity House will be visited during the morning. At the conclusion of the conference the members of the Northern Architectural Association will entertain the visiting members at luncheon at the County Hotel. Arrangements will be made to enable members to visit in the afternoon "Jesmond Dene House," the residence of Sir Andrew Noble, K.C.B., and "Jesmond Towers," the residence of Charles Mitchell, Esq., returning through Jesmond Dene. In the evening, at 7.30, the annual dinner will be held at the County Hotel. On Saturday arrangements will be made (for those who desire to do so) to visit Hexham Abbey and the Roman Station at the Chesters, Chollerford. Members will be able to return to the South *via* Newcastle, or those who prefer to do so can proceed to Carlisle and the Lake District and return by the West Coast route.

The Seventh International Congress of Architects will be held in London in 1906. The R.I.B.A. have appointed the following to be the Executive Committee:—Messrs. John Belcher, Aston Webb, T. E. Colcutt, Reginald Blomfield, Mervyn Macartney, Henry T. Hare, Alexander Graham, John Slater, Leonard Stokes, John W. Simpson, T. W. Cutler and W. J. Locke.

The following Council appointments to Standing Committees have been made under by-law 46:—*Art Committee*: Sir L. Alma-Tadema; Messrs. George Frampton, T. Raffles Davison, A. W. S. Cross and Leonard Stokes. *Literature Committee*: Messrs. Francis Bond, J. D. Crace, Col. Lennox Prendergast, Francis W. Bedford and A. C. Blomfield. *Practice Committee*: Messrs. C. Fitzroy Doll, Ernest Flint, Sydney Perks, E. R. Hewitt and H. A. Satchell. *Science Committee*: Messrs. F. N. Jackson, F. T. Reade, A. T. Walmisley, F. R. Farrow and Benjamin Tabberner.

An album of portraits of past-presidents, reproduced by photogravure from original paintings in the possession of the Royal Institute, has been prepared under the direction of a committee of the Council, assisted by Sir L. Alma-Tadema, R.A. The album, which is in half morocco, contains sixteen plates (India proofs) and nine blank leaves, with plate-marks for the insertion of India proofs of future portraits. A specimen may be seen in the Library, and members may obtain copies at the price of two guineas.

UNDERPINNING PARTY WALLS.

By W. E. CUTTER, F.I.B.I.C.C.

THE above illustration serves to show a method of underpinning a party wall for the purpose of making two rooms or buildings into one. This often happens where increased accommodation is required, as in large hotels or clubs. By adopting the method shown the system of strutting up the floors to carry the needles passing through the walls (which would greatly interfere with the rooms below) is entirely done away with. The elevation shows the timber needles put through at the required height, and the section shows the raking struts butting into a chase cut in each side of the wall. Cleats are bolted on the ends of the needles and spiked, the struts being cut to the required levels and allowance made for wedging, folding wedges being used at the ends. Stone templates are shown inserted for the steel joist to rest upon, but in heavy work and larger spans steel stanchions would be used which could be cased or covered with Jhil-Mil or wire-wove iron to receive plaster.

Tackle for hoisting can be attached to a cross-timber shown (or to a steel joist) on the top of the needles, care being taken that the required height is obtained for the necessary hoisting.

INSTITUTE OF SANITARY ENGINEERS.

Visit to Tunbridge Wells.

A NUMBER of members of the Institute of Sanitary Engineers visited Tunbridge Wells on Saturday and inspected the municipal works at Pembury, High Brooms, &c.

The party was welcomed by the Mayor (Mr. Alderman E. Elvy Robb), who, in the course of a speech, referred to the Public Health Acts, which, he said, while by no means perfect, had yet been of great public benefit. He took the opportunity of drawing the attention of the Institute to the deplorable state of the law at the present time as to the definition of the term "sewer." It was almost impossible for the most eminent lawyer to say when a private drain became a sewer, and, if so, when and under what circumstances it reverted from the capacity of a public sewer to a private drain. He had not the least doubt that the construction which was commonly placed upon the two terms at the present time was directly contrary to the meaning and intentions of the Public Health Acts dealing with the subject. An Association such as theirs might bring pressure to bear upon the Government of the day to place upon a satisfactory footing the question of what was and what was not a public sewer maintainable by the public authority, because at present a great responsibility devolved upon public authorities in connection with the real meaning of the terms, and disputes often arose which could be obviated if the matter was made clear once and for all. In conclusion he informed the members of the Institute that they would not find the undertakings in the town on a grand scale, but he believed they were efficiently carried out, and worthy of their consideration. He assured them that all the undertakings under the charge of their president, the borough surveyor (Mr. W. H. Maxwell), gave every satisfaction.

Trade and Craft.

Heating.

A very interesting and instructive pamphlet, entitled "Heating and Drying by Hot Water on the Small-pipe Safe Pressure System," has been issued by Messrs. Stanley Sheen & Co., heating engineers, of Surrey Street, Sheffield. This urges the claims of what is often called the "high-pressure" system of hot water heating, which, however, is a misnomer, for as this pamphlet shows the pressure need never exceed 8lbs. to the sq. in. for drying, and between 4lbs. and 5lbs. for ordinary heating, provided the installation is done by a competent firm of heating engineers. The pressure is of course produced by the water being confined in the pipes and the expansion which naturally occurs when water is heated. The advantages of the system are several; perhaps the most important are neatness, smaller pipes and radiators than with the low-pressure hot-water system, and very little cutting away, channelling, excavating, &c., for the reason that the pipes can be carried under or over doors, &c., trapping being disregarded. In consequence of the smaller volume of water in the pipes the temperature is raised much more quickly, and being hermetically sealed the waste of water is very slight. The system is especially applicable where high temperatures are required, as for drying or laundry purposes, enamelling, japanning, bread making, &c. It is very suitable also for churches and chapels, where perhaps heat is required only at intervals, say once or twice a week, and has been largely used with satisfaction in warehouses, schools, public buildings, large halls, &c. This pamphlet emphasizes the importance of having the apparatus attended to at regular intervals (which need not be frequent, for some apparatus is only attended to at intervals of three or more years) and by experienced and competent persons. The local fitter is often called in, but is generally unsatisfactory, and proves expensive in the end. The pamphlet will undoubtedly be read with interest and advantage by architects and builders, or anyone who has to deal with the fitting of heating apparatus. The statement of the case for the so-called "high-pressure" system is moderate and fair, for Messrs. Sheen instal all heating systems.

Wallpapers.

Messrs. John Line & Sons, Ltd., the well-known wallpaper manufacturers of 50, Berners Street, Oxford Street, W., recently opened large new showrooms at 162 and 163, Aldersgate Street, E.C., for the convenience of architects and others in the City. These have proved of great value. It is undoubtedly a service to be able to drop into such convenient, bright and well-arranged showrooms and look at the newest designs on the market, or to choose wall-coverings to suit any position or circumstance, without having to go some distance or else be forced to choose from a small pattern-book and a restricted selection of designs. Every class of wall-covering is shown at Messrs. Line's showrooms, and they have a large stock to supply from at a moment's notice. One speciality of this firm is an innovation which will doubtless be much appreciated, namely, a frieze without repeats which can be suited to apartments of any size. These "no repeat" friezes are hand-printed from blocks; and as there are a large number to each pattern, and they can be spread out or put as close together as desired, any length can be made, so that no repeat need occur in the room, however large. There are three designs, called the "Adriatic," the "Venetian" and the "Fishing Fleet," and these can be printed in any colour. Their character can be inferred from the titles; in design and appearance they are very happy.

The depth of the "Adriatic" frieze is 10½ in. and the price 1s. per yd. in stock colours. The "Venetian" and the "Fishing Fleet" friezes are 21 in. deep, and priced at 3s. 6d. and 2s. 6d. respectively in stock colours and 4s. and 3s. specially printed in any specified colour.

Tenders.

Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work. Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, 6, Great New Street, Fetter Lane, E.C.

Abertillery.—For the erection of a school and classrooms, Park Road, for the Trustees of Ebenezer Baptist Chapel. Mr. W. Beddoe Rees, architect, 37, St. Mary Street, Cardiff:—

Gaen Brothers	£2,248	0	0
J. Broad, L.T.I.	1,589	0	0
Skidmore & MacWhurtee ..	1,857	10	0
M. Adams,* Gelly Grug, Abertillery	1,800	9	0

* Accepted.

Bridge (near Canterbury).—For alterations and additions to Bridge Hill house, near Canterbury. Messrs. Fry & Miller, architects, Cannon Street, Dover:—

Hayward & Paramor	£3,389	0	0
G. H. Denne & Son	3,383	0	0
W. J. Adcock	3,164	5	8
C. Jenner	2,400	0	0
W. Bromley	2,826	0	0
T. T. Denne,* Walmer	2,820	0	0

Electric-light installation.

L. Sunderland & Co.,* Westminster	578	0	0
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* Accepted.

Brighouse and Raistrick (Yorks).—For the construction of sewers in the borough of Brighouse and district of Raistrick. Mr. A. M. Fowler, M.I.C.E., engineer, 1, St. Peter Square, Manchester:—

Buckley, Knaresborough	£6,173	9	6
J. Brook, Halifax	5,794	9	6
W. Brigg, Bradford	5,674	7	9
A. Graham & Sons, Huddersfield	5,563	0	0
Ward & Tetley, Bradford	5,525	9	0
H. & W. Barracough, Brighouse	5,459	3	1
S. Bedford & Son, Halifax	5,423	15	0
A. & C. Harris, Morley	5,415	0	0
D. Eadie, Stockport	5,385	0	0
W. Sutcliffe, Sowerby Bridge ..	5,036	0	0
Edmondson & Wyatt,* Oldham ..	4,682	15	0

* Accepted.

Cropston (near Leicester).—For the erection of cottages, for Miss Hind. Mr. J. A. L. Beasley, architect, 35, Friar Lane, Leicester. Quantities by architect:—

J. H. Poynton, Leicester	£1,095	0	0
Toone & Warrington, Ansty	945	0	0
S. W. Matthews, Leicester	900	0	0
Toone & Sons, Ansty	887	13	0
J. Cole, Leicester	886	12	6
Storer Brothers, Leicester	850	0	0

Devonport.—For alterations and additions to business premises, Marlborough Street, for Mr. C. E. Waycott. Mr. Edgar M. Leest, M.S.A., architect. Quantities by Messrs. Leest & Adams, 14, St. Aubyn Street, Devonport:—

W. T. Stevenson, Plymouth	£820	0	0
Pearce Brothers, Plymouth	747	0	0
A. Truscott, Stonehouse	746	8	6
Jenkin & Son, Devonport	739	0	0
Littleton & Son, Devonport	735	0	0
T. May, Plymouth	733	0	0
W. E. Blake, Plymouth	731	0	0
J. H. Palmer, Plymouth	730	0	0
Smith & Son, Devonport	719	13	0
G. P. Finch, Plymouth	620	0	0
F. Watts, Devonport	620	0	0

* Accepted.

Fulham, S.W.—For the erection of a new operating room at Fulham Parish Infirmary, for the Guardians of the Poor of Fulham Parish. Mr. A. Saxon Snell, F.R.I.B.A., architect, 22, Southampton Buildings, Chancery Lane, London, W.C. Quantities by Mr. W. T. Patten:—

C. Dearing & Son, Islington, N. ..	£1,389	0	0
Cowley & Drake, Willesden Green, N.W.	1,173	16	0
Martin, Wells & Co., Vauxhall, S.E.	1,167	0	0
Alph Leather, Wandsworth, S.E. ..	1,162	0	0
Stimpson & Co., Battersea, S.W. ..	1,160	0	0
Mattock & Parsons, Grays Inn Road, W.C.	1,091	0	0
F. G. Minter, Putney, S.W.	1,065	0	0
Thomas Bendon,* Hammersmith, W.	1,033	0	0

* Accepted.

Sheffield.—For the whole or any portion of the works in the erection of proposed Primitive Methodist church schools in Abbeydale and Edgemount Roads, for the Trustees of the Carterknowle Primitive Church. Messrs. Hall & Fenton, architects, 14, St. James's Row, Sheffield. Quantities by the architects:—

J. W. Winter, Handsworth, near Sheffield	£3,223	0	0
G. H. May & Son, Rotherham	3,175	0	0
Dawson, Jones & Co.	3,148	0	0
W. Chandler	3,000	0	0
T. Cuthbert, Nottingham	2,974	0	0
J. Mastin & Son	2,883	0	0
J. White & Son	2,875	0	0
H. Brumby & Son, Highfield	2,775	0	0
Marin & Hughes	2,853	0	0
H. Boot & Son	2,836	0	0
J. T. Robertson	2,827	14	0

E. B. Dyson & Son, Heeley	£2,799	10	0
H. Turton	2,760	0	0
H. Watkinson	2,725	0	0
J. S. Teanby	2,705	10	0
A. Bradbury	2,665	15	0
E. Moore	2,663	0	0
Wilson & Kenington	2,628	0	0
G. Allen	2,597	0	0
T. Margerison,* Church Street, Dronfield	2,590	0	0

[Rest of Sheffield.]

Thatcham (Berks).—For the erection of a police station with one cell. Mr. Joseph Morris, county surveyor, Broadway Buildings, Reading:—

Capel & Sons, Reading	£1,730	10	0
W. Stokes, jun., Reading	1,433	0	0
W. Hawkins, Reading	1,360	0	0
J. Wigmore, Theale	1,331	10	0
G. H. Tucker, Reading	1,284	0	0
Batten Brothers, Reading	1,260	0	0
Hoskings Brothers, Newbury	1,232	0	0
Margetts & Son, Reading	1,229	0	0
Smallbone, Stretealy	1,198	0	0
Goodall & Sons, Basingstoke	1,176	0	0
McC. E. Pitt, Reading	1,149	0	0
Jolly & Palmer, Reading	1,133	6	6
T. James, Midgham	1,118	10	0
Elms & Son,* Newbury	1,099	15	0

[County surveyor's estimate, £1,156 8s.]

* Accepted.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending July 22nd twenty-six failures in the building and timber trades in England and Wales were gazetted.

F. W. SCOTT, builder, Forest Gate. Adj. July 12th.

C. WARD, builder and joiner, Darlington. R.O. July 11th.

J. B. SHEARN, surveyor, Radstock, Mon. R.O. July 15th.

H. M. GOY, plumber, Northampton. R.O. July 11th. P.E., Northampton County Hall, Oct. 11th, at 12.

C. LILEY, builder, Aldershot. P.E., Guildford Town Hall, Aug. 9th, at 1.

R. T. CLARK, builder's manager, Carshalton. R.O. July 12th.

J. PRICE (trading as H. Price), contractor, Tonypandy. R.O. July 12th.

D. HURST (trading as the Full Way Pipe Couplings Co.), Manchester and London. Adj. July 14th.

J. TAYLOR, joiner, Syston, Leics. First meeting, O.R.'s, Leicester, July 27th, at 3. P.E., The Castle, Leicester, July 29th, at 10.

A. R. BULLEY, late builder, Fulham. R.O. July 14th. First meeting, London Bankruptcy Court, July 28th, at 12. P.E. same, Aug. 6th, at 11.

FLEW & Co., builders, Kensington. R.O. July 15th. First meeting, London Bankruptcy Court, Aug. 2nd, at 12. P.E. same, Aug. 30th, at 11.

S. H. HEFFER, builder, Colwyn Bay. First meeting, Crypt Chambers, Chester, July 27th, at 11.30. P.E., Magistrates' Room, Bangor, Aug. 4th, at 12.30.

J. CALVERT, plumber and decorator, Blackpool. First meeting, O.R.'s, Preston, July 27th, at 11. P.E., Preston Sessions Hall, Sept. 9th, at 11.

A. G. ERAUT, surveyor, Liverpool. First meeting, O.R.'s, Liverpool, July 28th, at 3. P.E., Liverpool C.C., Aug. 3rd, at 11.

B. F. C. GUNNING, builder, Bristol. R.O. July 11th. First meeting, O.R.'s, Bristol, July 27th, at 11.45. P.E., Bristol Guildhall, Aug. 5th, at 12.

MOORE & SONS, surveyors, house agents and builders, East Molesey. Gross liabilities £2,350; deficiency £2,021.

Coming Events.

July 25-30.

SANITARY INSTITUTE.—Congress at Glasgow.

Wednesday, July 27.

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—Scottish District Meeting at Glasgow.

NATIONAL FEDERATION OF BUILDING TRADE EMPLOYERS.—Summer meeting at Scarborough.

Saturday, August 20.

NORTHERN ARCHITECTURAL ASSOCIATION.—Visit to Sunderland.

Saturday, August 27.

NORTHERN ARCHITECTURAL ASSOCIATION.—Students' Sketching Club Excursion.

New Companies.

SHIPLEY TIMBER AND SAWMILL CO., LTD., Windhill, Yorks. Capital: £2,000.

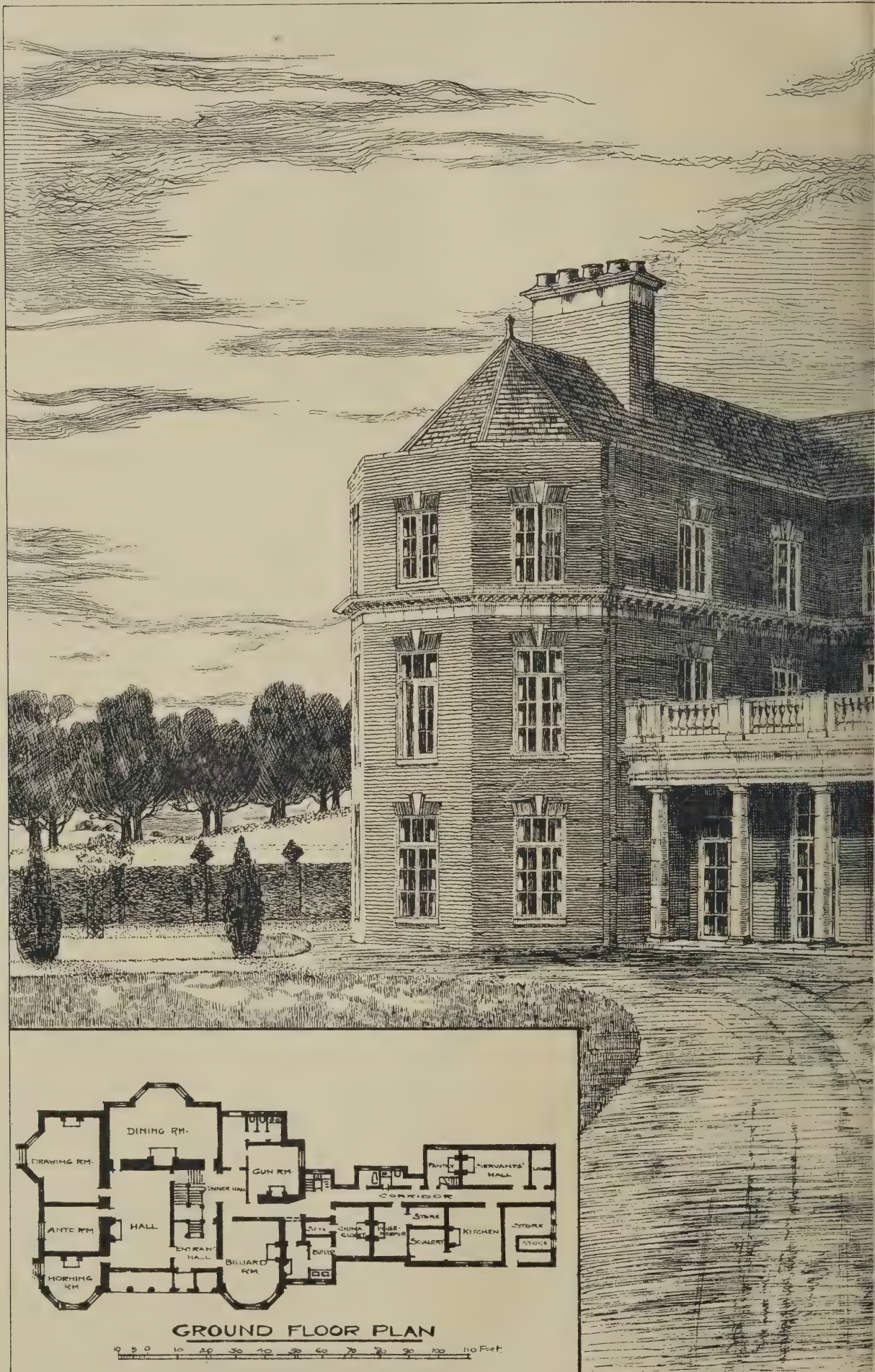
BRANDRETH SLATE QUARRIES, LTD., Dolwyddelan, Carnarvonshire. Capital: £20,000.

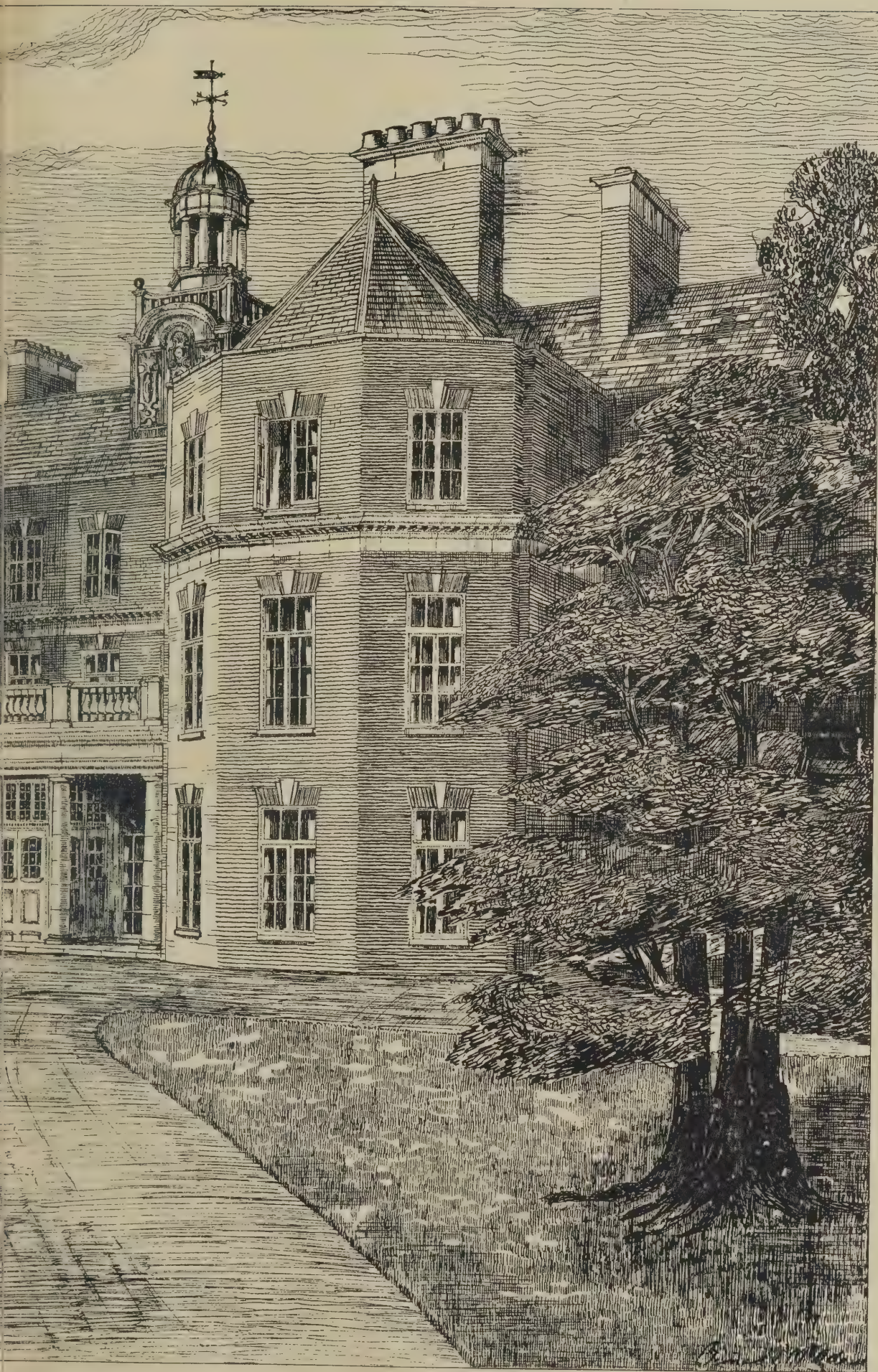
CAMBRIDGE BRICK CO., LTD., 100, High Street, Huntingdon. Capital: £15,000.

MAR HILL BRICK CO., LTD., Carlton, Notts. Capital: £3,000.

LIVERPOOL TIMBER CO., LTD., 56, West Derby Road, Liverpool. Capital: £7,000.

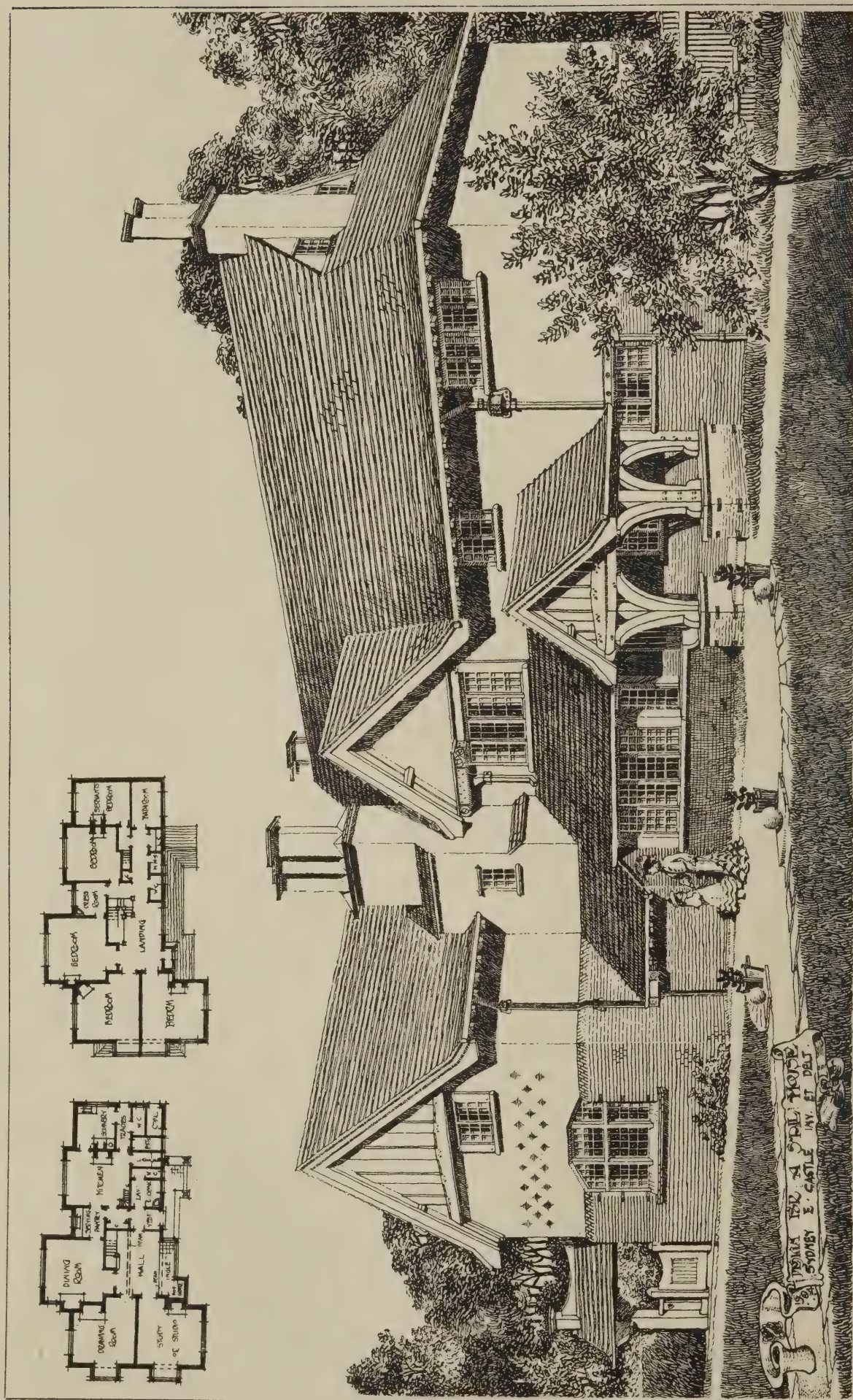
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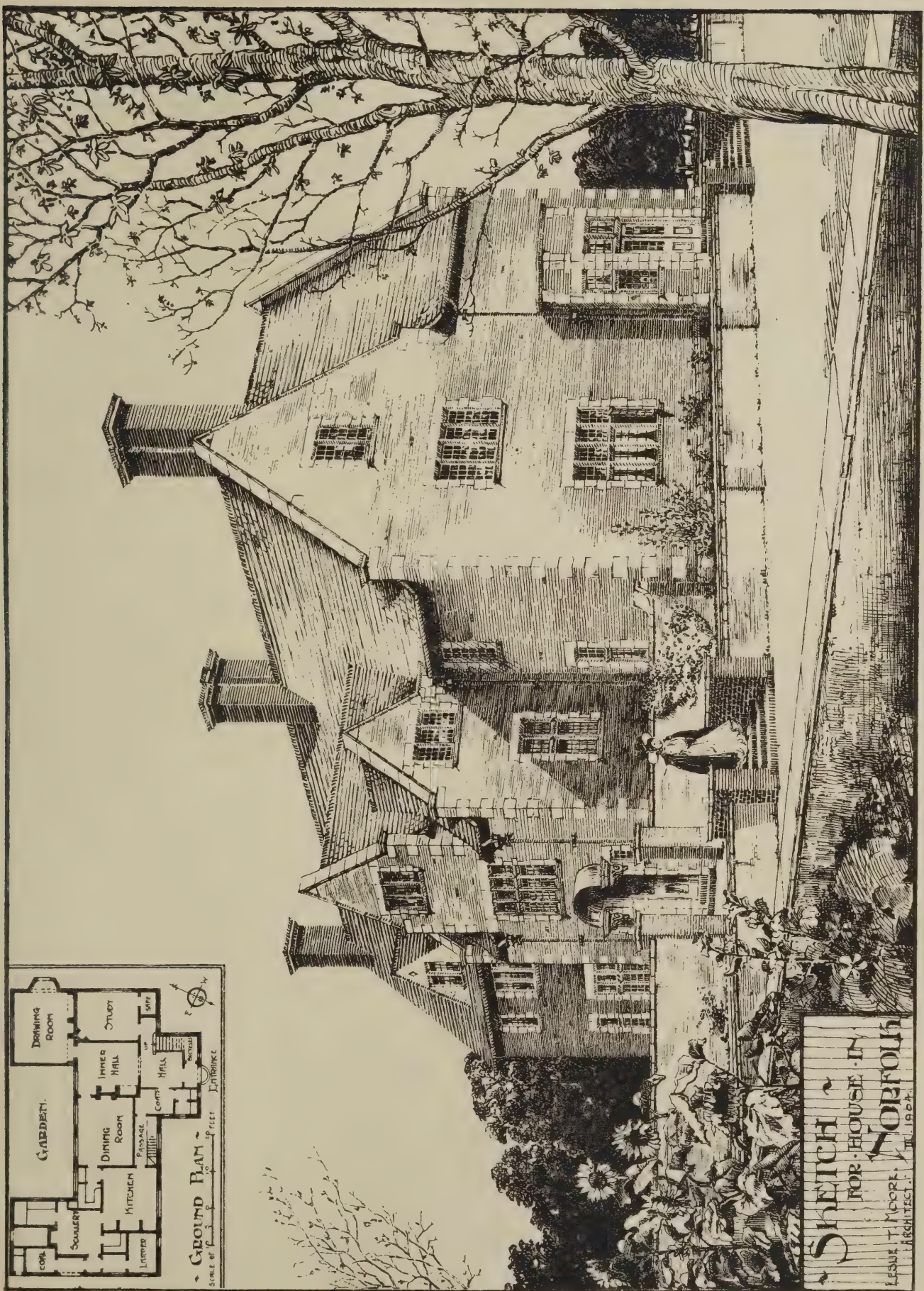
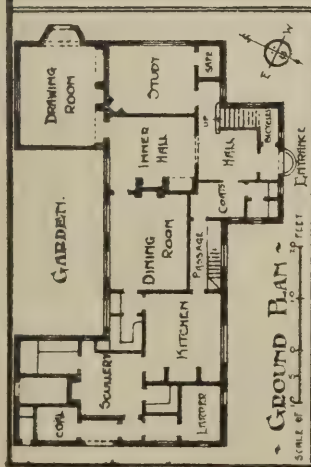




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1904

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

August 3, 1904. Vol. 20, No. 495.

6, Great New Street, Fetter Lane, E.C.

Summary.

The Sanitary Institute congress was held last week in Glasgow. The president drew attention to the condition of the Clyde and trusted that when the new drainage scheme was completed salmon would again be seen there. The municipality and the plumber was one of the subjects discussed, and a resolution was passed recommending that the authorities be empowered to require plumbers engaged on their work to be certificated by the Plumbers' Company. Speaking of housing, one member said he was the owner of some property in Liverpool which provided six rooms and a bathroom at a cost of 6s. a week, and with this house there was 400yds. of garden space. Municipal motor wagons were considered, the inclusive working cost of one being given as £7 10s. per week where the mileage did not exceed 220 and single shifts were worked. A resolution was passed urging authorities to prevent dust on macadamized roads in dry weather; and another that the whole question of water-supplies ought to be dealt with by a Royal Commission. One speaker suggested that members of local bodies should be paid, and that examinations should be held and certificates granted qualifying the holder for election to a seat on the local authority. Another speaker urged that a new Public Health Act was a much-needed reform. (Page 63.)

In Canada, if within ten years a building perish in whole or in part from a defect in construction, or even from the unfavourable nature of the ground, the architect superintending the work and the builder are jointly held liable. (Page 54.)

In a paper on chimney draught Mr. Yates says that the induced draught system, wherein a fan is placed between the boilers and the chimney, or at the point of discharge of the waste products, is by far the best mechanical means to adopt. The pressure is kept practically constant, the plant works just as well on a clear day as when damp or foggy, the height of the stack can be reduced, and no smoke is emitted. (Page 56.)

At the conference of the National Federation of Building Trade Employers held last week at Scarborough the Yorkshire scheme for district committees of masters and men and a county conciliation board was approved. (Page 61.)

The new bridge across the Exe at Exeter will be something of an engineering novelty, for the arch, instead of the usual eclipse, will be in the shape of a parabola, steel girders from either side of the river meeting in the centre and being there hinged together. The effect of this will be that the expansion and contraction of the metal in summer and winter will be made by the rise and fall of the centre, and not so much by actual variation in the length of the bridge. (Page 58.)

Students' Work at South Kensington.

THE annual exhibition of prize-winning work in the National Competition and the display of work by students of the Royal College of Art, both of which are now open at South Kensington, reveal some interesting designs and a healthy progress in some sections. If we consider first the work at the Royal College of Art it is mainly because the presence of two celebrated architects as professors has not been without its influence upon the students. The work of the Architectural School exhibits a most extraordinary vitality, upon which Professor Pite may be justly congratulated. The immense full-size drawings of the order of the Mausoleum at Halicarnassus, made from the column and entablature in the British Museum by Messrs. A. R. H. Jackson, H. Morley and A. E. Martin, show a reversion to the desirable points in French architectural education. The debilitating and narrowing effect upon the student in trying to render Greek detail on a small-scale drawing is not merely obviated, but the preparation of these large drawings must give him a sense of size and scale that should be invaluable in his after work. This sense of scale, one of the best features in modern French work, is at present sadly lacking in much of our English architecture. Another fine exhibit is that of measured drawings of All Hallows, Lombard Street, made last year, when this happily-preserved work of Wren still lay under the threatening shadow of destruction. The designing by first-year students embraces such subjects as a Roman Doric colonnade, a fountain in a public place, &c. These designs show promise; one of the fountain designs, a large bowl upheld by amorini, is of considerable merit. Among the exhibits of the Design School are a number of lunette mural paintings—a much neglected branch of design, but now apparently to be revived under Professor Lethaby's auspices. "The Steam Hammer" by Mr. W. T. Stamps shows happy colouring contrasts in the employment of greys and browns against the brilliant yellow-red of the heated metal. The stained-glass designs are also interesting, and Mr. W. H. Berry shows that it is possible to obtain a face in stained glass that neither has the morbidity of the Burne-Jones school nor the sickly sweetness of expression beloved of the church decorator.

THE National Competition works are in the Indian section of the Museum, Imperial Institute Road. The following are the

official figures:—(1) Works sent up for examination, 25,854 from 270 schools of art and branch schools, 9,420 from 199 science evening schools and day classes, 5,473 from 369 art evening schools and day classes; (2) works entered for National Competition, 6,460; (3) number of prizes, 9 gold medals, 52 silver medals, 163 bronze medals and 386 prizes of books. In the section devoted to the various forms of modelling are to be found the best things in the exhibition; the modelled design for a fire-dog by Mr. Ernest Copestick, of Nottingham, is quite the best work in the exhibition and is deservedly awarded a gold medal. The examiners (Messrs. T. Brock, R.A., G. J. Frampton, R.A., and T. G. Jackson, R.A.) in their report proclaim it to be "excellent in design and proportion," and showing "an understanding of the treatment required for metal." It is to be hoped that this model, with its well-poised and delicate female figure, so reminiscent of Stevens, may have a chance of being cast. Of the architectural work, with which we are mainly concerned, there is little to be said. The report of the examiners (Messrs. John Belcher, A.R.A., Reginald Blomfield and T. G. Jackson, R.A.) is very despondent. None of the works submitted in the measured drawings class are deemed worthy of a higher honour than a bronze medal, this being awarded to Mr. J. Harold Gibbons, of Manchester, for his drawings from Evreux Cathedral; "there is, however, a certain carelessness in the perspective of his sketch of the marble tabernacle which should have been avoided." In the class of architectural designs the examiners very much regret that the works continue to show a falling-off both in number and quality. They consider that some of the designs, such for instance as those for a theatre, a market, a concert hall and a club, which all appear under one school number, should never have been submitted, as they show a total ignorance of the first principles of architectural design. The examiners are surprised that the master should have passed such work, and still more that it should be sent up for competition. In too many of the sections the examiners regret that the work is not up to the standard, or that the promise of former years has not been maintained. Mention must be made of some excellent work in the tile section, and Mr. John Potter, of Derby, secures a gold medal for an excellent design for stencilled decoration for the walls of a church.

DRAWINGS OF ARCHITECTURE.

AFTER an interval of some weeks we now continue our series of drawings of architecture.

Mr. Frank L. Emanuel will be especially known to our readers for the sketches of "Disappearing London" published some time ago as frontispieces to THE ARCHITECTURAL REVIEW, but, excellent as these are, there is not one which equals the splendid Calais drawing reproduced on the opposite page, or the pencil sketch of the market square at Ghent reproduced below.

Mr. Emanuel has made a speciality of architectural studies, and it is evident from these drawings that he possesses a masterly skill with his pencil. There is nothing niggardly about the work. In every part it is bold, and thorough, while the freedom with which the figures are put in at once proclaims the artist who has drawn continually from the life—not necessarily "the life" of the art school, but people in everyday work passing hither and thither about the streets. The Calais drawing, we believe, was made after a downpour of rain, and possibly this gave Mr. Emanuel the opportunity of such a treatment of light and shade, with a thundery sky for background, as we see here depicted. The composition is good and the point of view well chosen; and the same remark applies to the Ghent drawing. Both are excellent examples of pencil work, which is Mr. Emanuel's favourite medium, but he is not limited to that, as may be seen by turning to the pen drawing on p. 56—made with a fine pen, but in no way a scratchy drawing.

Of Mr. Percy E. Nobbs's work we give an example on p. 57. The original is a water-colour bold in execution and bright in tone,

so that, so far as the latter is concerned, our reproduction must inevitably suffer. Yet, as given, the illustration is interesting, exhibiting clean brushwork.

FRENCH BUILDING LAW IN CANADA.*

By S. G. ARCHIBALD.

WHEN Adam delved and Eve span, I presume Adam was his own architect; and when Noah built the ark, I presume also he was his own architect under the guiding hand of Providence. Since then architecture has advanced with advancing civilization and the law in respect thereto has become gradually more and more complete, more and more crystallized by commentators and judicial decisions. Our own law is the French before the Code Napoleon.

We will consider the question of the "ten-year guarantee." The nature of the contract entered into between the proprietor and the architect is one of *louage d'ouvrage*, or lease and hire of work—a contract by which one of the parties agrees to do something for the other in consideration of a certain price. Thus the architect leases his work represented by the plans and specifications, and by his time and attention if he also directs the construction. Now, as a rule, and as a matter of common law, the reception by the proprietor of work done releases the workman in respect of that particular work, in the absence of fraud on his part; but our law governing architects in this regard is found in Articles 1,688 and 2,259 of the Civil Code of Lower Canada, which derogate from the common law and are as follows:—(1,688) If a building perish in whole or in

part within ten years from a defect in construction, or even from the unfavourable nature of the ground, the architect superintending the work and the builder are jointly and severally liable for the loss; and 2,259 says: "After ten years architects and contractors are discharged from the warranty of the work they have done or directed."

While at first sight this guarantee may seem to some unduly severe, yet reflection will lead to the conviction that it is a most salutary measure. In passing this law the Legislature had a threefold object—the proprietor was to be protected against his own ignorance, the architect and builder against their carelessness and neglect by means of this wholesome threat, and the public from the danger to which it might be exposed from the ignorance of the former and the carelessness of the latter. We thus see that not only are private interests at stake, but also public order, and this principle will be found the very fountain and source of the architect's weighty responsibility.

Now, what classes of people are subject to this guarantee? Generally speaking, we may say that those only are subject to it who have undertaken directly with the owner either the conduct or the construction of an immovable or of an integral part of the work.

The architect may occupy two different positions with respect to the proprietor, and his responsibility will vary accordingly. He may only furnish the plans and specifications, or he may, in addition, direct and control the work. What then will be the extent of his guarantee where he only furnishes the plans and specifications? With regard to the plans, it is evident that he can only warrant them in so far as they have been faithfully followed. His liability therefore will only be for defects which are the necessary consequence of the plans which



DRAWINGS OF ARCHITECTURE: THE MARKET SQUARE, GHENT.

he has drawn or of the specifications which he has given. Supposing that for motives of economy the proprietor himself employs the workmen to execute plans furnished by an architect, and after the building has been constructed some five or six years it threatens to fall down. The proprietor, in order to exercise a recourse against the architect, would require to prove that the plans and specifications had been followed, and that the defect lay in them and not in the construction—such, for example, as a weak foundation or insufficient beams, and so forth.

So also with respect to the material; the architect will only be liable for the nature of the material which he specifies, but not for the quality used by the contractor. Thus, an architect who specified wood where he should have specified steel will be liable if the building be endangered on that account. On the other hand, if he specify a material commonly believed among architects to be proper material, he will not be so liable.

A very much more important and interesting question presents itself with respect to the architect's liability for defects in the ground where he only furnishes the plan. This point is very much controverted. Some of the French authors consider that the architect has no responsibility with respect to the soil, inasmuch as he may never see it, but that the contractor who is on the spot must answer alone for this. On the other hand, though this guarantee may seem almost too rigorous, there is the question of public order and safety to be considered, and the sounder conclusion would seem to be that the architect is charged with this responsibility. The proprietor asks for a plan for a certain piece of ground. How then can the architect answer for the soundness of his plan if he does not examine the ground? How will he be able to tell of what depth his foundation should be without a careful examination of the soil? This, it seems to me, is the very first thing he should do, and, besides, is a thing which falls especially within the sphere of his particular knowledge. Without such an examination his foundations will be the merest guess-work. Someone must be liable. Shall it be the contractor alone, who as a rule has not so special a knowledge as the architect in that respect, and who on discovering the fault in the soil will have to come to the architect to notify him that his foundations are insufficient, and that he would do well to visit the ground in order to get some idea of what his foundation should be? Surely not. A defect in the soil is intimately connected with a defect in the plan because the plan must vary according to the soil. An error in this respect would be rather an error of conception than of execution. I am therefore of opinion that the architect is liable for defects in the ground even when he only furnishes the plan and specifications.

The architect's responsibility, then, is this: that he must answer for his plans, for the nature of his materials, and for the soil for which he has drawn his plans—and, of course, under the common law for his own fault which causes damage to the owner, even when the solidity of the building is not in question. If, for example, he were asked to give plans for a school capable of accommodating 500 pupils, and after construction it was found that 300 would crowd it, he would be liable in damages for this fault. If, however, as is generally the case, the architect also directs the work, his responsibility is still more weighty. Besides all of the obligations to which the architect who only furnishes the plans is held, he must warrant their proper execution, must see that the materials are of the proper quality and are properly used, and, generally speaking, is responsible for everything in connection with the building.



DRAWINGS OF ARCHITECTURE.

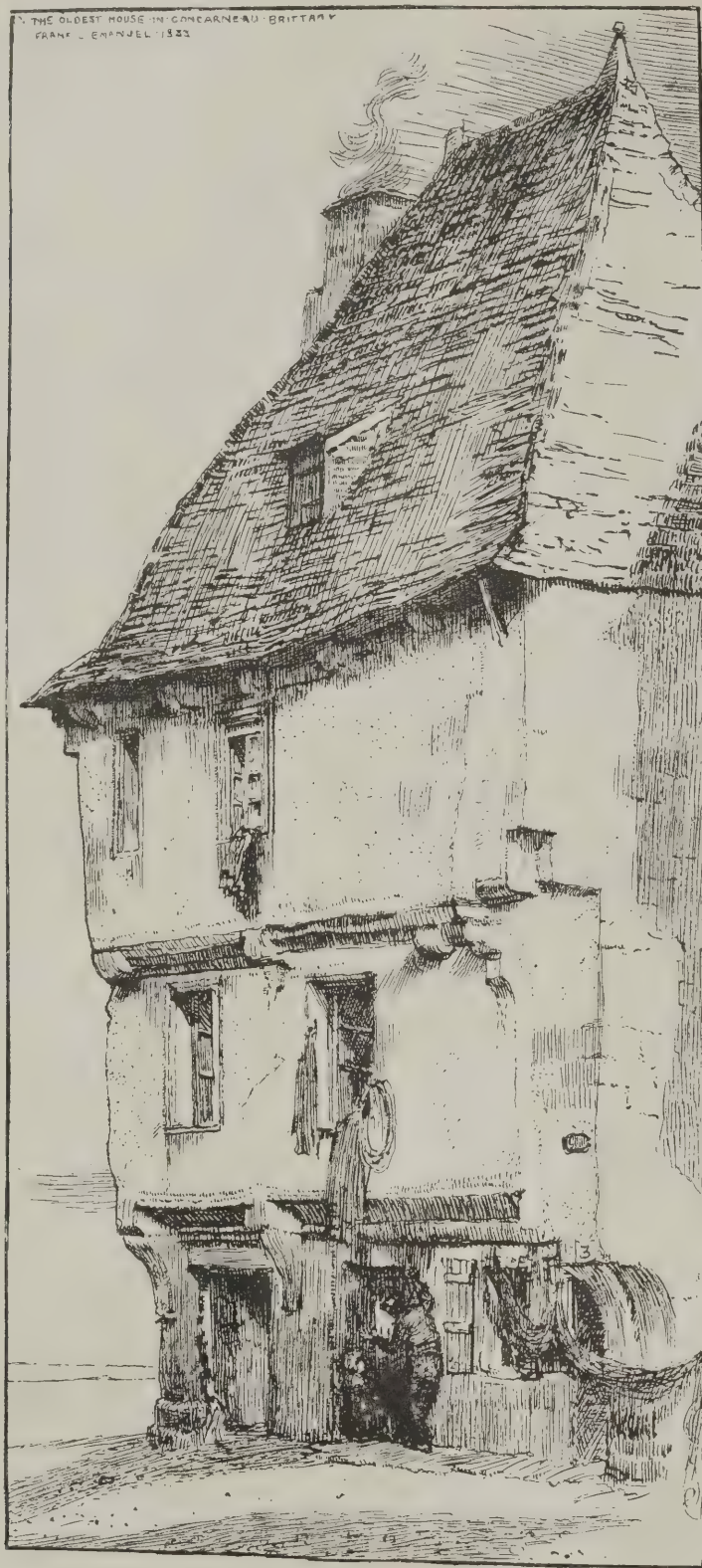
Not only in this case is the architect liable for defects in the soil, but he is liable for defects in construction which are only such on account of the peculiar situation of the building. Thus, for example, if the house is to be erected on a high bank exposed to heavy gales, it would be a vice of construction to roof it with slate if experience had shown that that class of roof could not properly resist heavy winds.

With respect to materials furnished by the owner, the architect is not liable unless a reasonable examination would have shown him their defective nature. If, on the other hand, they are furnished by the contractor there can be no doubt of his liability, saving always his recourse against such contractor.

All defects, absolute or negative, other than those of soil or material, may be called defects of construction—such, for example, as too weak foundations, insufficient dimensions of any of the materials, or a lack of proportion between the different parts so as to affect the solidity of the structure.

In addition to all this there is a presumption of defect in construction under the law when a building threatens ruin within ten years without extraordinary reason.

But not only are the architect and builder jointly and severally liable for their own work; they are liable where they have gone on with work already commenced by others; the architect is liable where the plans are furnished by another architect; and



DRAWINGS OF ARCHITECTURE.

the builder is liable where he goes on with work commenced by another.

The architect is liable together with the builder for errors committed by the latter, because he is held to see that a work well conceived by him is well executed by the builder.

The architect must also warrant that he has not violated any of the municipal regulations or any of the laws of the neighbourhood. Thus, if a mitoyen wall be pierced without the neighbour's consent, or if a chimney-hearth be placed directly over beams of wood, or if a well be dug near a neighbour's wall without any counter wall being provided for, in all this class of cases

the proprietor could recover not only the damage to his own building but whatever he may have been compelled to pay his neighbour for damage done to him. The architect must build so as to leave no room for any complaint on the part of the neighbours. This guarantee must be distinguished from the guarantee of solidity on the part of the architect, from which he is relieved after ten years.

We have seen that the architect under the law is liable for every derogation from the principles of his art and for every infraction of the rules and laws which, as a professional man, he ought to know. Can he, by contract with the proprietor, rid himself

of this weighty burden of responsibility? What if, when he has pointed out to the proprietor the defects in the soil or in the material or in the plans furnished him, the proprietor insists on his proceeding and contracts to relieve him from the guarantee imposed upon him by law? What, then, is his position? A glance at the principle in virtue of which this responsibility is placed upon the architect will give us the answer. Public order and safety are concerned, and private individuals cannot by contract derogate from that which concerns public order. The architect is not relieved in such a case, and his duty to himself and the public is to refuse to proceed with the work. It of course goes without saying that he is not responsible towards the proprietor who has so released him, but he would be towards third persons damaged in any way by the ruin of the building.

CHIMNEY DRAUGHT.*

By WALTER YATES, M.I.M.E.

AN insufficient supply of air causes imperfect combustion of the fuel, indicated by the production of smoke. An excess of air causes waste of heat. The maximum efficiency is therefore to be secured between these two extremes.

Natural draught is that produced by a chimney. The only openings to a chimney should be at either end of it; the top allowing the hot gases to escape, and the bottom, represented by the boiler, allowing the cold atmosphere to flow in.

Under these conditions the inflow would continue till the internal walls of the chimney fell to the temperature of the external, when the flow would cease, and commence flowing upwards or downwards as the temperature increased or decreased. This explains the bad effect on draught of a leaky chimney.

The leakage of air through a chimney or boiler setting has a very serious influence on the draught, and is often accountable for a very greatly decreased efficiency; not only is this the case with faulty brickwork, but it takes place where the mortar joints are apparently sound. The effect is, of course, to increase the volume of air and decrease the temperature, resulting in a reduction of the draught in the chimney.

If the temperature of the chimney falls below that of the atmosphere, there is a down-draught, a good example of which is a fire being lighted in a damp or cold room in a house.

Draught then is caused by the superior weight of a column of cold air over the weight of a similar column of equal height of the hot air enclosed in the chimney.

A chimney with natural draught will have a draught dependent upon its height, the power of which will not vary, except upon the rise or fall of the internal temperature. It has, therefore, no sucking power; in fact, the term suction in this connection is a fallacy. The chimney acts because the external air is heavier than the internal, and thus presses into the chimney by the only available opening, namely, that at the bottom, the furnace front. The pressure or intensity of the draught fixes the amount of fuel it is possible to burn on a given area of grate. It therefore becomes necessary, when it is desired to increase the steaming capacity of a boiler by increasing its coal consumption, to increase the intensity of the draught, and the only way in chimney draught is to increase the temperature of the gases passing up it or increase the height of the chimney. The first method, of course, means a large

* Extracts from a paper read before the Institution of Heating and Ventilating Engineers at Liverpool on July 21st.

amount of waste, and is a very uneconomical arrangement; the second is expensive and unusual.

A chimney stack 150 ft. high will burn from 15 lbs. to 20 lbs. of coal per sq. ft. of grate-area per hour under normal conditions, but in wet or foggy weather it will be very much less than this, as the wet air is lighter than the dry and thus produces less pressure at the furnace (the weight of water vapour is about half that of air).

A fair average of temperature in the furnace is 2,400 degs. Fahr., and that of the escaping gases at the chimney without economizers 600 degs. Fahr. This means that one-quarter of the total heat generated is sent up the chimney to waste. Thus, on a 2,000-h.p. plant almost 500-h.p. is going up the chimney per hour, and the coal bill necessary to sustain this will come to a big figure in the year.

Suppose we could reduce the amount of air accompanying each pound of coal from, say, 24 lbs. to 12 lbs. (the chemical requirement), and the temperature kept the same, then we would only send one-eighth of the total power up the chimney and save one-eighth of the coal bill at the same time. The temperature in the furnace would then be greater, the heat generated greater, and, of course, the temperature of the gases at chimney less.

The effect of the draught and the air supply to boilers having been demonstrated to be of such importance, we are brought now to the consideration of the best means of producing the requisite draught, and it is not only the author's contention, but has become a well ascertained fact, that it is cheaper and better in every way to provide the necessary supply of air for burning fuel in steam boilers by mechanical means, and to take as much heat out of the hot gases after they have ceased to be in contact with the boiler itself before they are turned out into the atmosphere, than to do it in the older way by utilizing a portion of the heat generated to create the necessary supply of air.

There are several forms of mechanical draught, and perhaps the first step in that direction is the use of steam jets, though these are certainly the most expensive means on an ordinary land installation of Lancashire, Cornish or water-tube boilers.

It is with fan draught that this paper is intended more particularly to deal.

Fan draught may be divided into two distinct classes—forced and induced. Forced draught may again be sub-divided into two methods—closed stokehold and closed ashpit.

The closed stokehold method is almost exclusively used for ship work. It can scarcely ever be adopted for land work or stationary boilers.

In the author's opinion, by far the best method of obtaining draught by mechanical means is the induced draught system, wherein the fan is placed between the boilers and chimney, or point of discharge of waste products into atmosphere.

By such an arrangement the coal consumption may be increased from the 15 lbs. to 20 lbs. per sq. ft. of grate in chimney draught to 30 lbs. to 40 lbs. per ft. under ordinary conditions, and beyond this amount in special circumstances. This results not only in a proportionate increase of steaming capacity in the boilers, but in greater efficiency of combustion, and consequent economy.

An opening is made in the flue between the economizers and chimney, and the fan inlet connected thereto by a short brick or metal flue. Another opening is made in the main flue at a point nearer the chimney, or into the chimney itself, and this opening is connected to the fan outlet in the same way as to the inlet.

Between the openings, and inside the main flue, is placed a damper, so that all gases,

after leaving the boilers, must of necessity pass through the fan on their way to the chimney so long as the aforementioned damper is closed. It is also customary to place dampers both at the inlet and outlet of the fan, so that by manipulating these two and the one in the main flue the fan may be cut out, and natural draught resorted to in case of necessity.

The very satisfactory results secured by a system of induced draught are due to a less volume of air being required, though at a higher pressure than with chimney draught. A chimney usually works at a vacuum of $\frac{1}{2}$ in. to $\frac{3}{4}$ in., while an induced fan is generally arranged to give $1\frac{1}{2}$ in. to 2 in. In consequence of this, thicker fires can be carried and higher temperatures maintained, resulting in more rapid conduction of heat through the heating surface, and therefore a greater economy of heat than with chimney draught.

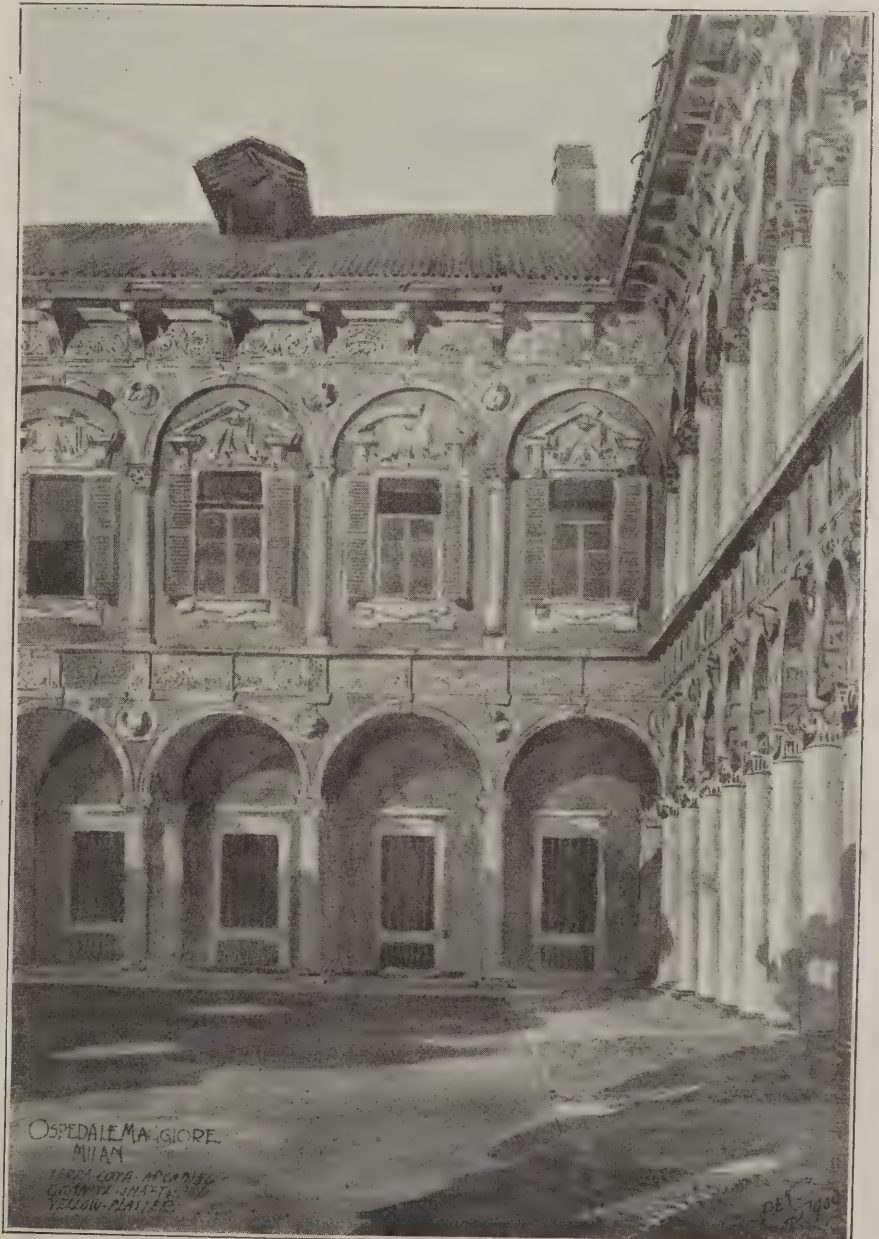
This high temperature of combustion and consequent increase of evaporating power of the boilers is such that usually three boilers with induced draught will do the work of four with chimney or natural draught. Occasionally even better results than this have been secured.

One of the best arguments in favour of induced draught is that by it the pressure may

be kept practically constant, and consequently the temperature, so that the boiler shell and furnaces do not contract and expand to the same extent, thus saving large sums of money in repair bills for leaky joints and rivets; and a most valuable feature of an induced draught apparatus is that it enables the high temperature upon which a chimney depends for its results to be dispensed with; in fact, the more heat abstracted from the gases by economizers and such like apparatus for heating water, air, &c., the better it is for the fan.

An induced draught fan renders the plant it is working with quite independent of climatic conditions. A chimney that will just do its work on a clear cold day may give considerable trouble in damp or foggy weather, but a fan is always positive and alike. It is also more flexible and under control, rendering it capable of answering to sudden calls. In the case of an electric-light station, for instance, if a heavy fog comes on there is a big rush for current, and consequent heavy demand on the boilers. If chimney draught has to be depended upon it will be at its worst under such conditions, but a fan would not be affected by the fog, and would answer at once to the demand made upon it.

A very important point not yet touched



DRAWINGS OF ARCHITECTURE: PERCY E. NOBBS, M.A., A.R.I.B.A.

upon, and particularly applicable to buildings projected, is the question of the chimney in relation to induced draught. A stack higher than that necessary to carry the gases about the surrounding property, say about 50 ft. high, is useless where an induced draught fan is at work. It therefore pays to consider the question of fan *versus* chimney in the matter of first cost, and also as to economy of space.

Bricks and Mortar.

Aphorism for the Week.

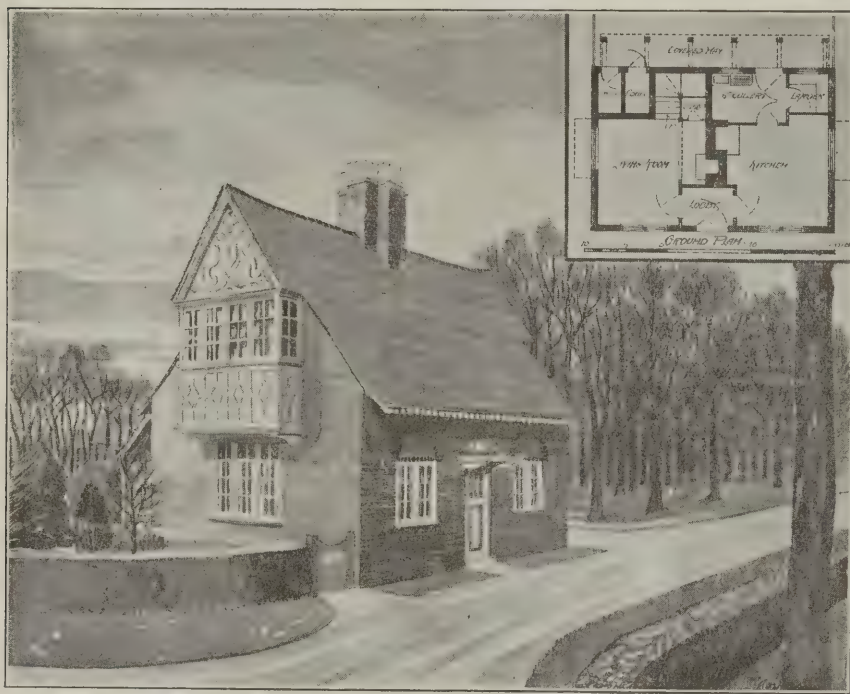
If you have understood anything I ever told you about Gothic, you know that no architecture was ever corrupted more miserably or abolished more justly by the accomplishment of its own follies.—RUSKIN.

Our Plates. THE small house by Mr. Sydney E. Castle (The Studio, Louvaine Road, S.W.), was designed to obtain certain accommodation and treatments, and to arrive at these as economically as possible. The

as high as the first-floor sills, are the only remains of the old mansion which was demolished. The walls are cement-faced outside. The portico is built with Portland stone, and the roof is of green Westmoreland slates. The walls of the entrance lodge, illustrated on this page, are faced with local red bricks and the roof is covered with hand-made tiles. The plasterwork on the projecting gable windows on the first floor was modelled by Mr. T. Stirling Lee. The builders were Messrs. Miskin & Sons, of St. Albans; Mr. C. J. Harold Cooper, of 1, Lincoln's Inn Fields, W.C., being the architect.

Exeter's new Bridge.

THE new bridge now being built across the Exe at Exeter will cost, with its approaches, about £50,000. It is something of an engineering novelty, for the arch, instead of the usual eclipse, will be in the shape of a parabola, steel girders from either side of the river meeting in the centre and being there hinged together. The effect of this will be that the expansion and contraction of the



LODGE, "PORTERS," SHENLEY, HERTS. C. J. HAROLD COOPER, ARCHITECT.

details are kept very simple and mouldings eschewed, the window- and door-frames being treated merely with rounded edges to avoid the severity of sharp lines. The materials used externally are yellow stock bricks for the lower part, white rough-cast for the upper part, and small stone tiles laid in varying courses. The rainwater heads, eaves-gutters and down-pipes are cased in oak to follow the rest of the woodwork. The plan has been arranged so as to include all rooms and offices necessary for a house of this class on good working lines, and to separate without isolating the servants' portions, so that they may be readily accessible with the rest of the house.—The house on the north coast of Norfolk by Mr. Leslie T. Moore, 14, Great Ormond Street, London, W.C., is proposed to be carried out in local bricks with Ancaster stone dressings and tile roof. The chief feature of the plan is the inner or living hall, off which are the dining-room and drawing-room. The site, sloping away to the south, enables a terrace to be formed with a dwarf wall surrounding the tennis court.—"Porters," Shenley, Herts, is now being completed. The external walls,

metal in summer and winter will be made by the rise and fall of the centre, and not so much by actual variation in the length of the bridge. The principle has been adopted before, but never in a bridge of such long span. Steel will take all the stress of the bridge, cast-iron being used for all the ornamental work and the blocks on which the structure will rest. The design and construction have been under the personal supervision of Mr. C. A. Brereton, a partner of Sir John Wolfe Barry. The bridge will consist primarily of eight pairs of steel girders. The road which they are to carry is to be of jarrah wood blocks, on which will be laid electric tram lines. The weight of the bridge—something over 500 tons—will be taken by great beds of concrete, which go down 14 ft. 6 in. below summer water-level. Each of the abutments will sustain a thrust of about 2,000 tons. The facing and corners are of granite, chiefly from Messrs. Easton's Blackingstone quarries on Dartmoor. Some of the largest blocks weigh over 9 tons and come from Cornwall. The bridge is to be completed by the end of October.

Builders' Notes.

Ilfracombe's New Water-supply, which has been brought from Exmoor Forest through fourteen miles of pipes at a cost of more than £55,000, was opened on Wednesday last by Viscount Ebrington.

The Extensions to the Commercial Travellers' Schools, Pinner, are being warmed and ventilated by means of Shorland's patent Manchester grates, those previously supplied having proved very satisfactory.

The Completion of the New Drive on the East Cliff at Bournemouth and the acquirement of Boscombe Pier as a municipal property were celebrated last week. The new drive, which is a mile in length, has cost over £3,000. Boscombe Pier, formerly the property of a company, was recently purchased by the Corporation for £9,000, and has been improved at a cost of £3,000, a bandstand having been erected at the pierhead.

Stockport's new Town Hall.—The Town Hall Committee of the Stockport Corporation received fourteen tenders for work in connection with the new town hall and have decided to accept the lowest, that of Mr. William Pownall, of Stockport, which was as follows:—For erecting the building in Portland stone, £54,496; for the same work in Crossland Hill stone, £53,776. It will be decided at a future meeting what kind of material will be used.

The National Harbour Works at Dover were visited recently by the Junior Institution of Engineers. From the Admiralty Pier the party was taken across to the Prince of Wales Pier, where the big Atlantic liners of the Hamburg-American line now call. This pier was built by Sir John Jackson, Ltd., to the designs of Messrs. Coode, Son & Matthews. The swing-bridge on the connecting railway was shown in motion. After luncheon the Admiralty harbour works were seen, the members being conveyed by the contractors' railway along the east arm. The total length of sheltering works is 9,520 ft. and the area enclosed will be 610 acres at low water. All the under-water work of the Admiralty pier extension and of the east arm is practically completed, and a commencement has been made on the island breakwater, which is to be built in a similar manner with concrete blocks, the bedding of the first course being prepared by means of grabs and the use of diving bells.

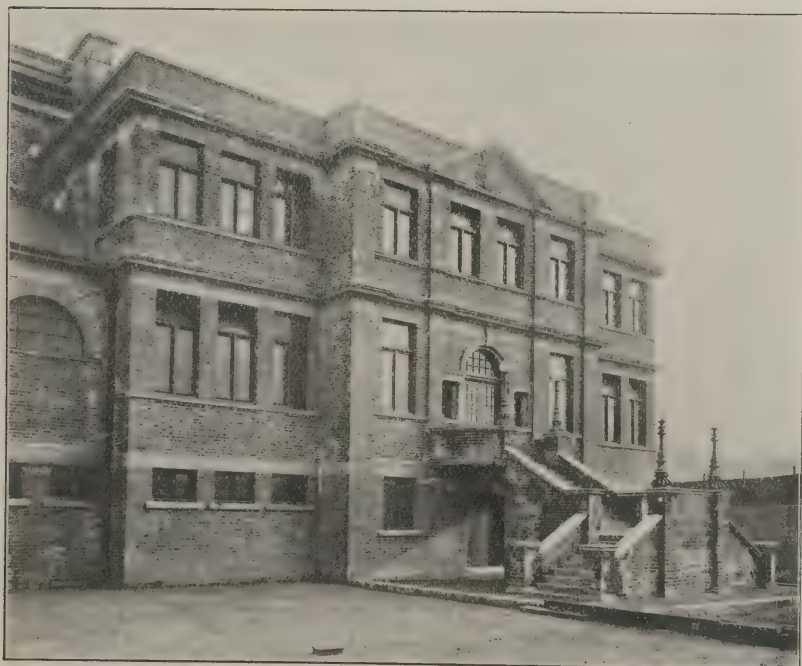
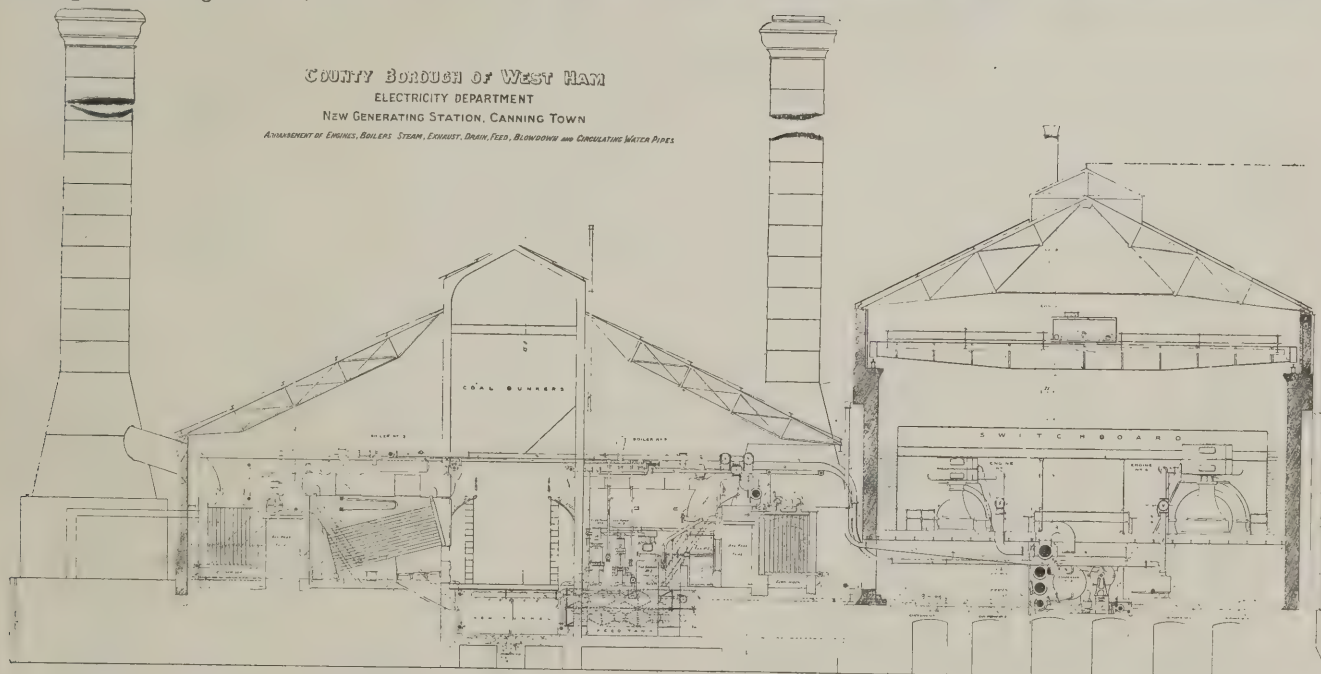
Public Health Congress.—Speaking at the Congress of the Royal Institute of Public Health held at Folkestone, Mr. W. Harpur, M.I.C.E., borough engineer, Cardiff, and president of the engineering section of the congress, complained of the appointment by personal influence of incompetent men to the post of surveyor; he thought the intervention of the Local Government Board was needed to ensure the selection of qualified men only and at adequate salaries. With regard to the need for improved legislation in respect of the Public Health Acts, Mr. Harpur referred to the Housing of the Working Classes Act, and said that if the Act was to become of benefit to the working classes it was necessary that there should be some relaxation of the building by-laws and better terms as to loans. Referring to the Model By-laws of the Local Government Board, Mr. Harpur said they were incomplete, unwieldy, unintelligible and impracticable. The previous building by-laws of the authority which he served were superior in many respects to the Model By-laws, especially in regard to the width of streets. It was full time that the right should be conferred upon local authorities of determining within the limit of 60 ft. the width of any new street destined to become a main thoroughfare.

WEST HAM ELECTRICITY STATION.

THE new electricity power station at West Ham has been erected on the site of the old sewage-pumping station at Canning Town from designs by the borough engineer, Mr. John G. Morley, A.M.I.C.E., the machinery having been designed and installed under the supervision of the borough electrical engineer, Mr. James K. Bock, A.M.I.E.E.

In preparing the ground for the foundations, four of the old sewage settling tanks were demolished, the remaining four being adopted for use as cooling tanks.

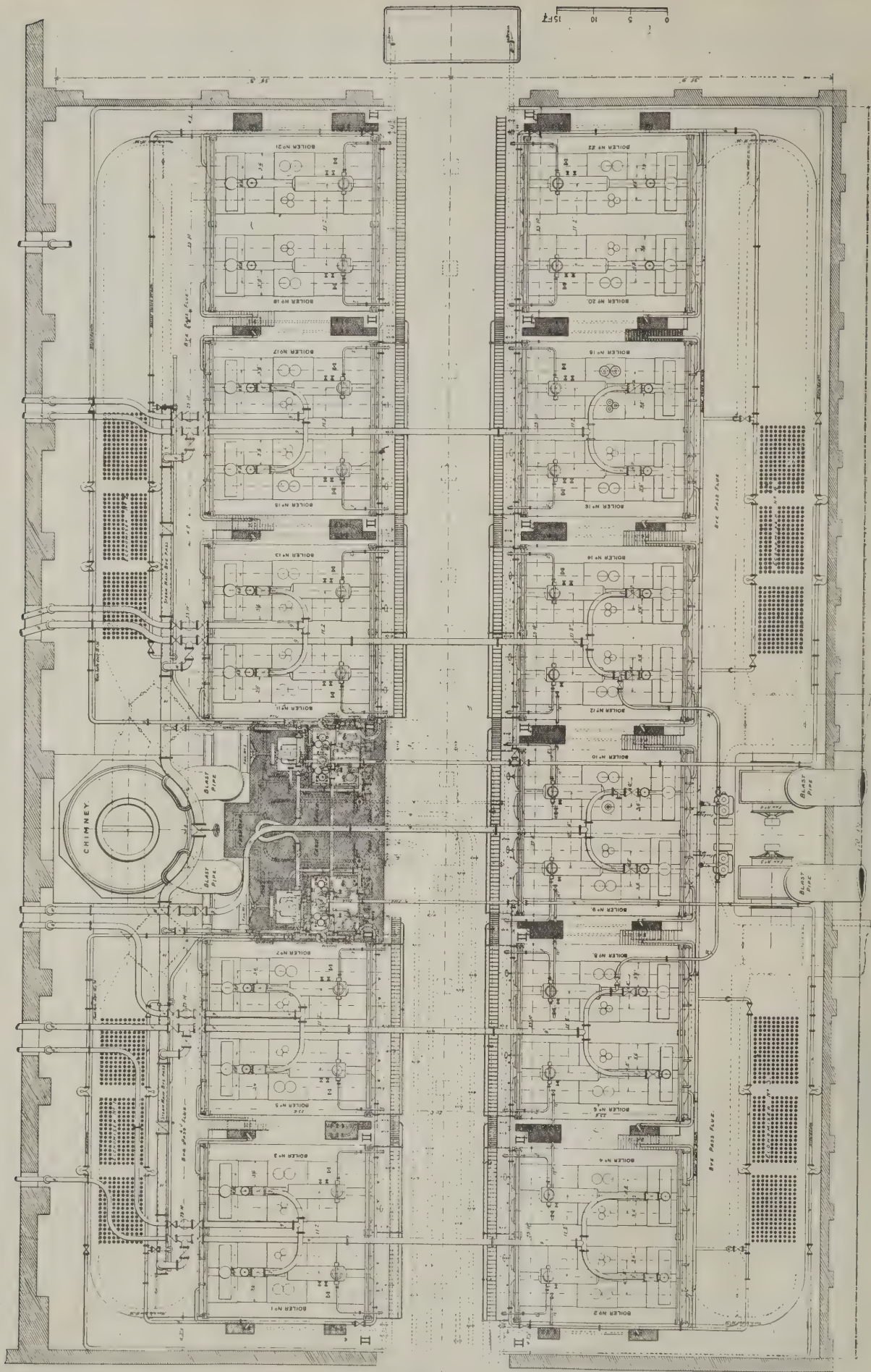
Owing to the nature of the ground it was necessary to take special precautions to ensure a stable foundation. Several borings were made, which revealed, at a depth of about 16ft., a bed of gravel of about 9ft. thick overlying the London clay. The foundations are composed of Portland-cement concrete. Five longitudinal concrete walls were brought up from the main foundations under the whole length of the engine-house, a concrete



THE OFFICES.

floor being spread over the same to carry the machinery beds. These also were formed of concrete, encased with stock brickwork and faced with glazed bricks where abutting on the condenser pit. The buildings comprise the engine and dynamo house, boiler-house, offices, workshops, &c.

The engine-house is 185ft. long, 65ft. 6in. wide, and about 70ft. high from the floor to the condenser pit to the top of the lantern. Accommodation has been provided for six engines and dynamos for lighting, and three for tramways, space being left for an extension of one tramway and two lighting sets. The walls are constructed solid under the crane girders, with external piers arched over to carry the wall above the crane level supporting the roof. Internally, these are finished with a tiled dado 8ft. high, above which they are rendered with Portland cement, and painted. The roof is formed of steel principals, boarded over and slated, with a lantern 18ft. wide, running the entire length of the building, constructed of steel covered with patent glazing, and provided with side-lights, all of which are opened by gearing from the engine-house floor. The boiler-house is 170ft. long, 108ft. wide and 64ft. high from ashpit floor to top of lantern, providing space for twenty-two boilers. Messrs. Gregar & Son were the builders (contract £53,999).



WEST HAM ELECTRICITY GENERATING STATION, CANNING TOWN: ARRANGEMENT OF BOILER-HOUSE AND PUMP-ROOM.

BUILDERS IN CONFERENCE AT SCARBOROUGH.

THE summer conference of the National Federation of Building Trade Employers of Great Britain and Ireland was held last week at Scarborough. The proceedings opened on Tuesday, when about 200 delegates assembled at noon in the council-chamber at the new town hall. Among those present were:—Alderman W. H. Jessop, J.P. (Huddersfield), president; W. Shepherd (London), senior vice-president; J. Macfarlane (Manchester), junior vice-president; J. Howard Colls (London), J. Bowen (Birmingham), Alderman W. Holdsworth (Bradford), W. Sapcote (Birmingham) and C. W. Green (Liverpool), hon. vice-presidents; W. Nicholson (Leeds), hon. treasurer; C. H. Barnsley (Birmingham) and E. J. Brown (London), hon. auditors; J. Alfred S. Hassal (Liverpool), secretary, and the following elected members:—Messrs. J. W. White (Sunderland), T. Wilkinson (Middlesbrough), E. Good (Hull), R. H. Carr (Scarborough), A. W. Sinclair (Scarborough), P. Rhodes (Leeds), Councillor W. J. England (Barnsley), John Dawson (Huddersfield), A. Moulson (Bradford), J. Bigger (Sheffield), S. Smethurst, J.P. (Oldham), James Storrs (Stalvbridge), H. Matthews, J.P. (Manchester), H. Warbrick (Lancaster), J. B. Johnson (Liverpool), R. Hall (Bury), J. Bromage (Worcester), Arthur Chambers (Leicester), James Wright (Nottingham), J. Dickinson (Derby), W. Wistance (Walsall), C. O. Dallow (Birmingham), Albert S. Smith (Birmingham), E. J. Brown (London), T. Gregory (London), F. L. Dove (London), Frederick Higgs (London), W. F. Wallis (Maidstone), E. J. Neale (Bristol), G. Wilkins (Bristol), E. Walters (Bristol), E. Mudge (Exeter), W. B. Lewis (Hereford), Councillor W. M. Blackburn (Newport, Mon.), W. T. Morgan (Cardiff), Councillor Mansfield (York), Alderman Boyne (Birmingham), Mr. Smithers (Bolton) and Mr. Dawson (Huddersfield).

The Mayor (Councillor William Morgan) extended a cordial welcome to the Federation. Alderman Jessop thanked the Mayor for his kind expressions, and said that in the municipal administration of the country they frequently found builders who were willing to devote time and ability to the management of civic affairs.

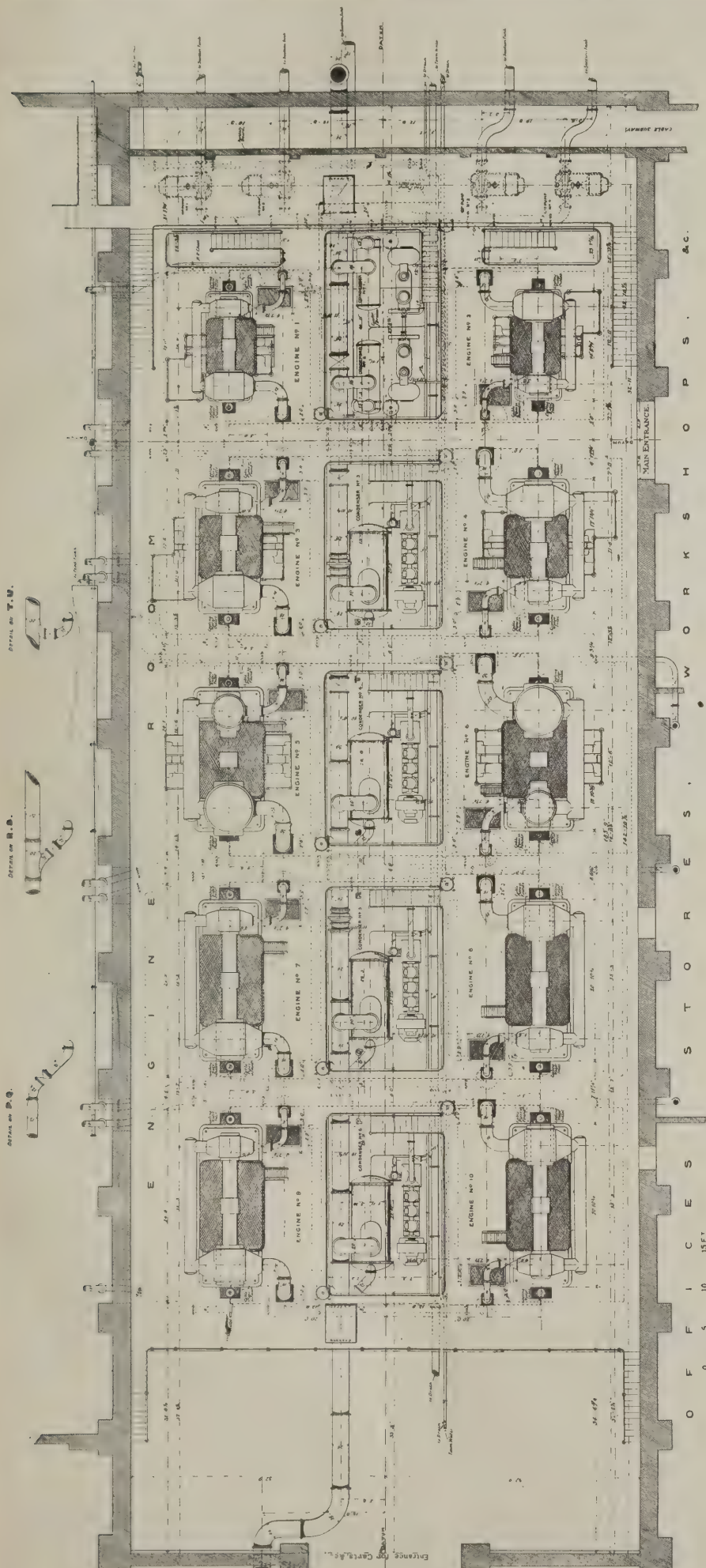
In the evening a dinner was held at the Grand Hotel, when Mr. E. Good, president of the Yorkshire Federation, announced that at a Council meeting in the afternoon the Yorkshire scheme for a closer union between employer and employed had been adopted.

Mr. J. Dawson, of Huddersfield, in proposing "The National Federation of Building Trade Employers," said the credit for establishing the Federation belonged, he believed, to Lancashire, and in a few months Yorkshire followed suit. It was a success from the first, and to-day they held the respect of the officials of the men's union. He thought there would be fewer strikes in the future, because of the respect the Federation had inspired.

Mr. Good again referred to the Yorkshire scheme on Wednesday, when he said it was hoped that, by district committees of masters and men and the County Conciliation Board, strikes and lock-outs—so disastrous to all parties—would be averted. Approval was expressed of the principle involved, and it was resolved to refer the matter to the Emergency Committee for further consideration.

An agreement with the National Association of Operative Plasterers was considered, and it was decided to request the National Association of Master Plasterers to furnish the secretary of the National Federation of Builders with a definition of the word

WEST HAM ELECTRICITY GENERATING STATION, CANNING TOWN: ARRANGEMENT OF ENGINE-HOUSE. JAMES K. BOCK, A.M.I.E.E., BOROUGH ELECTRICAL ENGINEER.



"defaulters," and that a conference be held between the appointed committee of the National and the Executive Committee of the National Association of Master Plasterers.

The conference discussed the question of a national reserve fund, and a request was made from the Dublin Master-Builders' Association to have the recently adopted R.I.B.A. contract form extended to Ireland.

It was decided to hold the next half-yearly meeting in January, in London.

IN PARLIAMENT.

(By our Press Gallery Representative.)

IN the House of Lords on July 25th, Lord Stanmore moved the appointment of a Select Committee to enquire and report with respect to the unfinished condition of the rooms in the Palace of Westminster appropriated to the service of the House of Lords and their approaches. He mentioned that

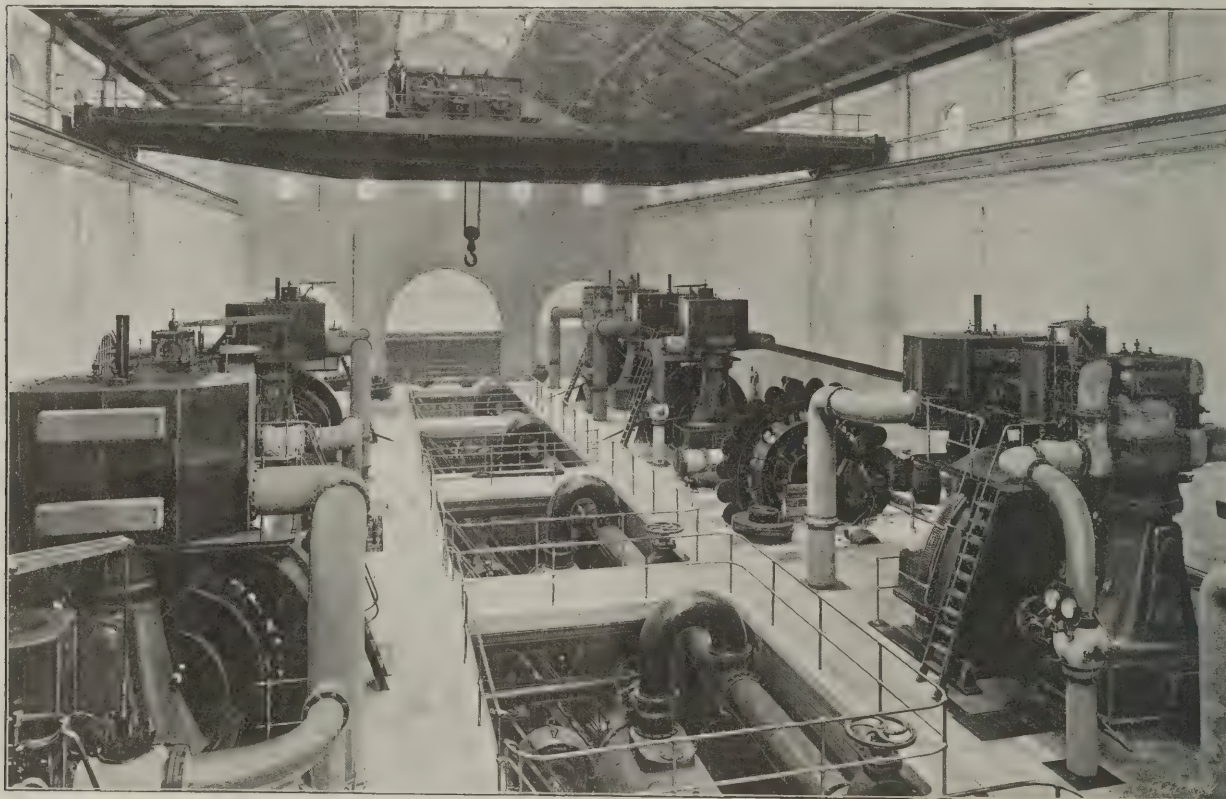
of considerable sums of money. At this period of the session it was impossible to appoint a Select Committee. The buffet to which the noble lord had referred could not be taken out of its place, as it was required for the service of the House. As to the frescoes, they had been carefully examined, and Professor Church had reported that their condition was so bad that it was useless to spend money on restoring them. He regretted that he could not give a more satisfactory answer, but he hoped that some day it might be possible to proceed with the decoration.

Earl Spencer thought the way in which this country dealt with matters of art generally was occasion for reproach. It was a great misfortune that the Government could not spend a small sum annually in carrying out decorations. He suggested that a joint committee of both Houses ought to be appointed to consider the matter.

The motion for the appointment of a

slates in cement, and if so, to what thickness of wall? Or would you suggest the covering of all the interior wall faces with some damp-resisting material? The damp extends 2ft. or 3ft. above the floor line."

The only satisfactory way of dealing with this case is to underpin and to cut away a course of brickwork all round the house immediately above ground level, and then insert a slate or felt damp-course piece-meal, a somewhat tedious and expensive process, I fear. Of course the damp-course should go right through, whatever the thickness of the wall may be. Possibly some mitigation of the evil may be arrived at by opening a trench round the walls of the building and coating the exterior vertical face with a mixture of pitch and tar or with "Hygeian rock composition" to a height of 2in. or 3in. above ground level, afterwards, of course, replacing the earth. I presume the whole building has proper spouting and down-pipes? I have known this to be the real



WEST HAM ELECTRICITY GENERATING STATION: GENERAL VIEW OF ENGINE-ROOM.

the decorations were incomplete, and referred particularly to St. Stephen's Hall, where the stone panels had been filled with green paper. He suggested that they should be occupied by pictures or mural decorations of some sort. A fine stone fireplace at the foot of the staircase leading to the committee-room corridor was at present hidden by a buffet, and this was a matter that deserved attention. He also alluded to the neglected condition of the frescoes in the vestibule at the top of the staircase.

Lord Windsor, the First Commissioner of Works, said it would no doubt be extremely desirable to cover the walls of the chief public buildings with splendid mural paintings and decorations, but he was obliged to give the same answer as he gave last year. Very large sums of money were being spent on Government buildings and necessary public works, and the necessity for economy in our public expenditure was so well known to the House and to the noble lord who had moved the motion that he was not able to press upon the Treasury the importance of taking up this work at this particular time. It would necessarily involve the expenditure

Select Committee was negated without a division.

Lord Balcarras, in reply to Mr. Bryce, said that negotiations were in progress between the Town Council and the Office of Works in regard to the old walls of Berwick-on-Tweed. It was hoped that satisfactory arrangements would be made for the protection and maintenance of these historic remains.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Damp Walls.

W. S. R. writes: "How can I prevent damp rising in the walls of a house built with absolutely no slate or other damp-proof course? Is it practicable to insert

trouble, even when the dampness has been attributed to the absence of a damp-course. The latter is quite a modern invention.

F. S. I.

Cornice on Wall.

LONDON.—H. J. H. writes: "Would a Portland stone cornice projecting 18in. from a 14in. wall, as sketch (not reproduced), cause settlements to appear in the upper floor? The wall is part of a building recently erected, and all in cement. It is alleged that the cornice has turned the front wall slightly over. There is about 15ft. of brickwork above the cornice, which is in two stones."

No. The suggestion is absurd.

Hennebique Concrete Construction.

LONDON.—J. W. B. writes: "Who is the London agent for Hennebique fireproof floors, or to whom should I apply for information concerning same?"

Mr. L. G. Mouchel, of 38, Victoria Street, S.W., is the sole agent in this country for Hennebique concrete construction, an article dealing with which appeared in our issue for July 30th, 1902.

SANITARY INSTITUTE.

Congress at Glasgow.

THE twenty-second annual congress of the Sanitary Institute was held last week in Glasgow. The opening proceedings took place on Tuesday evening in St. Andrew's Hall, where the delegates were received by Lord Provost Sir John Ure Primrose.

President's Address.

At the inaugural meeting Lord Blythwood delivered his presidential address. He said it was twenty-one years since the last congress of the Institute visited Glasgow, and he was sure if there were any present who were members of that congress they would see the fruits of their labours in the increased sanitary efforts and arrangements of the city. In Scotland much had been done to improve the sanitary condition of the people both in the towns and in the country. Sanitation as now recognized came into life in 1885 with the Scottish Registration Act. In 1847 the population of Glasgow was 320,000 and the death-rate was 56 per thousand, while in 1903, with a population of over 800,000, it was 18 per thousand. A few years ago, when cholera reared its head in Glasgow, it was practically stamped out by the sanitary officers before it made any progress. The scientific attack of disease led to new means being taken to get rid of the filth of the city. Where did they think it all went? Into the Clyde, which thus became an open sewer. This rendered necessary improvements in other directions, and he trusted that under careful administration when the new drainage scheme now in progress was completed they would not only have once more a pure river—in which salmon, now only seen in the city arms, might again disport themselves—but that they would be able to compel neighbouring towns and populous places in the Clyde valley to dispose of their sewage without polluting the river. Coming to problems of the future, Lord Blythwood said one of these was the great blotting out of light over the city. He knew how difficult the smoke problem was, but, at the same time, he believed that if it were not for a certain amount of what he might call awful conservatism, it might be possible to take up some of the inventions which had been made for the abatement of smoke nuisance: some of them were frankly empirical, but there were others which not only reduced the cost by enabling the whole of the carbon to burn in the furnace, but also purified the smoke that came out.

On Wednesday only one section met—science and preventive medicine—but conferences of municipal representatives and between engineers and surveyors to county and other sanitary authorities were held at the University.

At the conference of municipal representatives (presided over by Councillor W. F. Anderson, J.P.) the Lord Provost read a paper on

The Smoke Problem.

in the course of which he said they knew that the intensification of fogs by the admixture of smoke emissions directly incited disease by absorbing from the rays of the sun the blue, violet and ultra-violet light, which had been discovered to be fatal to all bacterial life. He contended that each town should have connected with its sanitary department some means for gauging and analysing the amount of smut in the air.

Mr. Robert Crawford, LL.D. (Glasgow) read a paper on

"The Municipality and the Plumber,"

in which he advocated the registration of all plumbers. He moved that "it is necessary to the effective administration of the Public Health and Water Acts that the relative authorities be recommended and empowered

to require that the competency of plumbers employed to execute or inspect plumbers' work under the regulations of those authorities shall be certified by the Plumbers' Company under the conditions appertaining to the national registration of plumbers, or by such other body as may be set up by statute or be approved by the Local Government Board."—Alderman Hyndes (Stockton-on-Tees), in seconding the resolution, observed that as much of the plumber's work was out of sight, and seldom inspected by the architect or the clerk of works, it was all the more desirable that the work should be done by a competent workman.—After some discussion the resolution was adopted.

Sir Samuel Chisholm, Bart. (Glasgow), read a paper on

"The Municipality and the Housing of the Poor,"

upon which discussion followed.

Councillor Burgess (Glasgow) said it had been demonstrated beyond question that the one-apartment house sacrificed life.—County Councillor Lambie (Larkhall) said he had lived in a one-room house, and some of the best men and women of Scotland had been reared in one-room houses. It was all very good for people from England to come and say we must have three- and four-apartment houses, but where was the money to be got? The first law of life was that a man should pay his way, and he certainly could not see how a man could afford to pay for more than one apartment out of an income of 16s. or 18s. a week.—Mr. Grieve (Liverpool) said he was the owner of some property in Liverpool which provided accommodation of six rooms and a bathroom at a rent of 6s. a week, and with this house there was 400yds. of garden space. He failed to see how that could not be done in Glasgow.—Mr. Smith (Birmingham) said he would like to know how this six-roomed house in Liverpool was built at the rent.—Dr. Simpson (Liverpool) said he was well acquainted with such houses. The value of the ground on which they were built was 1s. a sq. yd., and the house itself cost £150.—Dr. Boobyer (Nottingham) spoke of the great difficulty of getting many of the very poor people to become more cleanly in their habits. A large proportion of them were extremely dirty in their ways, and they had only to be left alone for a time and they would lapse into conditions from which great efforts had been made to raise them.—Mr. Cooper (Aberdeen) said that as practical men they must deal with the position as it stood. In Scotland it was evident they were in rather a bad position as compared with England, and he thought that the land question was at the bottom of it. If private enterprise could not be compelled to provide the necessary housing accommodation for the people of a town, then the municipality must do it. It was not a question of what it would cost or whether it would pay. It was for them to maintain a high standard of public health, and on that ground alone they were bound to take action. He quite agreed that it was better to give a house of many apartments. But he thought Mr. Burgess was not practical when he condemned the one-roomed house in the circumstances which obtained in Scotland.—The president, in closing the discussion, said they would be materially helped in solving the problem if they had a more sympathetic Department of the State to which they might appeal. Sixty years was not long enough to spread the payment for dwellings erected by a municipality. It was unfair to burden the present generation with paying for valuable houses and property of which posterity would get the benefit.

Municipal Motor Wagons.

At the conference of engineers and surveyors to county and other sanitary authorities, presided over by Mr. W. Weaver,

borough engineer, Kensington, Mr. E. Shrapnell Smith read a paper on motor vehicles in relation to municipal service. He said the motor was no longer the rich man's toy; it was finding a utilitarian place in our daily life. As to the dust nuisance, that should pre-eminently concern the municipal or the county surveyor. The cure for this really intolerable disturbance of road detritus lay neither in the extermination of automobilists nor in the imposition of ridiculous speed limits. The remedy appeared to lie in the gradual laying down of metal that had been steeped in tar or other similar liquid, with proper consolidation and limited binding matter. Many local authorities had seen a return for the outlay on the purchase of a light motor-car for the surveyor or engineer. Such an outlay provided a ready means of inspecting outside work, particularly in urban and country areas, and the freedom of locomotion saved both time and money by enabling the officer to supervise in person, without curtailment of his indoor hours or administrative work. A good two-cylinder car to seat four could be bought for £300, and the running cost, with a youth at £1 a week, should not exceed £150 a year for an average distance of 180 miles per week. The advantage of a four-seated car was that members of a committee could make inspections, as was so often necessary, with the minimum loss of time. With regard to motors for municipal work, such as street watering, haulage and refuse removal, he stated, as the result of enquiries at a large number of authorities, that the principal economies were found to be effected in the cartage of heavy materials and in street watering, but that dust or refuse disposal was doubtful unless there was a long lead to the tip or destructor. The general experience appeared to confirm the accepted commercial figure of £7 10s. per week as the inclusive working cost of a motor wagon when the mileage did not exceed 220 and single shifts were worked. In concluding, Mr. Smith suggested that the conference might pass a resolution expressing the opinion that the advent and increase of motor vehicles on public highways renders it imperative in the interests of public health (a) that municipal, urban and county estimates should in future provide for the use of fixing liquids during dry weather on existing macadamized roads, and (b) that in the construction and repair of macadamized roads the metal should be impregnated before spreading with some cohesive liquid appropriate to the local conditions.—A short discussion followed, after which the president recommended that the resolution should be in general terms, and he accordingly moved that, as an expression of opinion, it be represented to the General Committee that in the interests of public health it is imperative that municipal, urban and county authorities should adopt methods for the prevention of dust during dry weather on macadamized roads.—Mr. E. G. Mawbey (Leicester) seconded this motion, which was carried.

Mr. W. Hillman read a paper on

The Utilization of Destructor Residuals.

Assuming that the leading types of destructors were of equal efficiency and produced a vitreous clinker, there were many purposes to which this could be applied. As a filtering medium for sewage works crushed clinker was unsurpassed, being harder, more porous and less liable to disintegration than coke. As an aggregate for concrete it was superior to such materials as broken stone or ballast. Ground into mortar it found a ready sale for building works, and made an excellent plastering material provided the iron particles were extracted. It might be crushed or graded for tar paving. For road-making rough clinker from the cooling floor made the best hard core procurable, providing, as it did, a superior drainage bed,

tending to keep the road surface dry. A new industry was springing up in the manufacture of bricks, and this seemed to him one of the most satisfactory methods of clinker utilization. No serious difficulty seemed to be experienced with the disposal of flue dust, its absorbent qualities being such that up to 30 per cent. of pure carbolic acid could be added, thus making an economical disinfectant for ordinary purposes. The greatest source of inconvenience in a destructor works was the number of tins and discarded metal vessels. It was possible to reduce them to marketable form at one operation by running off the solder, burning off the tin, and then compressing the sheets into "cheeses" with the miscellaneous bits of old iron interposed. Paper might be reduced to a wet pulp or a dry fibre, in which state it would find a ready sale for many industrial purposes other than remanufacture.—A discussion followed.

On Wednesday five sections held conferences, including that of "Engineering and Architecture," which met for the first time.

Sewage-disposal.

Professor Henry Robinson delivered his presidential address, in which he dealt with sewage and its disposal. In doing so he said the want of proper provision for dealing with storm water at outfalls was often a fruitful source of trouble. Where the results were unsatisfactory the failure was mainly attributable to the fact that the discharge at the outfall, through defective construction of sewers or otherwise, prevented whatever system of treatment was in operation from having a chance of success. He pointed out the benefit of sedimentation tanks, and illustrated this by a reference to experiments carried out by the Massachusetts State Board of Health and to investigations made at Birmingham, Huddersfield and London. He suggested that a Royal Commission might bring into definite shape the lines which legislation should follow as to whether it would be advisable to have the country divided into drainage areas, forming natural boundaries coterminous with sanitary districts, so that the needs of the entire population within each area should be equitably dealt with.

Control of Water-Supplies.

Dr. James R. Kaye submitted a paper on the "Supervisory Control of Water Supplies," at the conclusion of which the following resolution was passed: "That this meeting is of opinion that the whole question of water-supplies demands investigation by a Royal Commission appointed specially to deal with that subject, and that representations be made to Government accordingly."

Mr. Gilbert Thomson (Glasgow) read a paper on

Domestic Sanitary Engineering in the West of Scotland.

He pointed out that the present standards of design, construction and testing were simply those of the various building regulations, and that though there was no difficulty in getting good work done the usual run of work could only just pass muster, and this, not because of any great economy thereby effected, but because the regulations and methods of inspection did not give any inducement to do better. He was satisfied that it would be possible to bring all work up to the standard which was now regularly attained in high-class work. Not only would that be possible, but it would be a measure of economy.

House Drainage and Sanitary Fittings.

Three papers dealing with these subjects were submitted. Mr. Samuel Smith and Mr. J. W. Pearson dealt with the comparative merits of fireclay pipes and cast-iron pipes for underground drainage, the former being advocated by Mr. Smith and the latter by Mr. Pearson: while Mr. Shanks gave details

as to the fittings that should be used for sanitary purposes in dwelling-houses.

Dr. George Reid and Mr. J. E. Willcox contributed a paper on the importance of

Uniform Distribution of Sewage on Filters.

Mr. Willcox described the process that had been adopted in the experiments at Hanley, pointing out that it had been impossible to ensure perfectly uniform distribution without power-driven distributors. Dr. Reid stated that the degree of purification which had been effected was excellent.

Local Authorities and the Public Health.

The conference of municipal representatives was resumed, and among the papers read was one on "Sanitary Local Authorities and Administration of Public Health" by Mr. W. Cooper (Aberdeen). In view of the large variety of matters which the growth of municipal enterprise had imposed upon the consideration of public bodies, the present system of election would not, he thought, prove sufficient in the future. He suggested the payment of members of local bodies as a means of improving their competency to deal with the questions which came before them. Side by side with this scheme he also suggested the giving of lectures in the working-class districts of cities on sanitation and other subjects, and the holding of examinations and granting of certificates, the holding of which would gradually become a qualification for election to a seat on the local authority.

The Sanitary Inspector's Insecure Office.

A conference of sanitary inspectors was also held on Wednesday. Mr. T. F. Strutt, late chief sanitary inspector, City of Westminster, who presided, devoted his opening address to the insecure tenure of office of sanitary inspectors. How could a sanitary inspector, he asked, be expected to do his duty fearlessly when the Council which employed him was (as commonly the case) composed of slum property owners, house farmers, jerry-builders and their friends? What he proposed was that the sanitary inspector should have fixity of tenure in his office, with the right of appeal to the Local Government Board, and if possible superannuation. In conclusion, he advocated the establishment of a Ministry of Public Health, but he did not want one fashioned upon political lines governed by a party ignorant of practical public health problems and science. In the absence of a Government Department, he testified to the value of the work of the Sanitary Institute.

Mr. Anderson (Middlesbrough) moved that the conference again adopt a resolution expressing regret that the Council of the Sanitary Institute had not seen fit to appoint one or more sanitary inspectors as members of the Board, and asking them to reconsider their decision. The resolution was adopted.

Consolidating the Public Health Acts.

Mr. J. H. Clarke read a paper on the consolidation and amendment of the Public Health Acts. A new Public Health Act, embracing the Public Health Amendment Act, 1890, the Housing of the Working Classes Acts, the Factory and Workshop Acts, the Public Health (Water) Act, the Infectious Diseases Acts and the amendments thereto, with certain readjustments and additional provisions, was a much-needed legislative reform. He had some hope that their legislators, actuated by increasing enlightenment in sanitary science, would in the near future place at their disposal one common Act, embracing a uniform code of by-laws, applicable to all sanitary districts, and placing at its head a Minister of Public Health with a seat in the Cabinet.

Bacteriological and Chemical Treatment of Sewage.

On Thursday, before the section devoted to physics, chemistry and biology, Prof.

Frank Clowes, of London, president, delivered an address, in the course of which he said that at one time the treatment of sewage by chemical processes was almost universally recommended, then electrolytic treatment appeared upon the scene, and at the present time the discussion mainly turned upon the various means of applying biological treatment. It appeared now to be generally conceded that some method of controlled biological treatment would be generally accepted for rendering sewage inoffensive and providing for its disposal.

Prof. Gerald Henderson (Glasgow) said, in view of the fact that the Glasgow authorities were committed to the precipitation method of sewage treatment, it was interesting to find a chemist and sewage expert of Dr. Clowes's standing and experience who stated without hesitation that the bacterial treatment was the right one.

The section devoted to engineering and architecture resumed its sitting.

A Standard Test for Portland Cement.

Mr. Ernest C. Matthews, C.E., in a paper on Portland cement endeavoured to show that the time had arrived when there should be a standard test, which every cement manufactured or used should pass. It seemed almost incredible that in this country, where cement was first used, there was, unlike Germany, France, Russia and other countries, no standard test.

Ventilation of Factories.

Mr. H. M. Robinson, H.M. Inspector of Factories, read a paper on the "Ventilation of Factories and Workshops." Factory legislation had not, he said, as yet laid down any standard of ventilation required in ordinary factories and workshops, though the law gave power to the Secretary of State to do so in any particular class of work. It was a great mistake to suppose that because a room was large it did not therefore require special means of ventilation. It would probably be found advantageous, roughly speaking, to provide one medium-sized outlet for every five or six persons in the room. The Lobin system for introducing fresh air was simple and effective; it consisted of vertical shafts carried up the inside walls about 5ft. or 6ft. and connected directly at the bottom with the outside air.

Ventilation of Schools.

Dr. Alfred Greenwood, Medical Officer of Health, Blackburn, followed with a paper on "School Ventilation." He said that, generally speaking, the air of a room could not be changed more frequently than three times in one hour; but this, of course, did not apply to very hot weather.

Mr. Key (Glasgow) expressed the belief that the proper way of ventilation was by mechanical change of air which would be positive irrespective of changes of wind and weather. The change of air would be 12 to 14 times per hour positively in summer, and say 10 times per hour in winter, irrespective of outside conditions.

Mr. James G. D. Armstrong contributed a paper on "The Past, Present and Future Conditions of Housing under the Public Health Act," upon which a discussion ensued; at the conclusion a resolution was passed recommending that "the definition of overcrowding as 400 cub. ft. per adult person and half the amount per child in sleeping rooms is required in the interests of the public health."

Mr. Alexander Cullen contributed a paper on "The Construction of Hospitals," and thereafter the section adjourned to meet again on Friday in a joint discussion with section III. on "Sewage Disposal."

[The remainder of our report is held over till next week.]

Trade and Craft.

Compoboard.

The disadvantages of plastering—its expense and the valuable time lost by it—are familiar to everyone connected with the building trade; as also the insanitary nature and unsightliness of matchboarding. So that one is happy to find so excellent a substitute in "Compoboard," which is made of timber enclosed between wood pulp, and can be obtained in sheets 4ft. wide up to 18ft. long. It is quite true in surface and is not liable to buckle, warp or bulge, and as the joints made every 4ft. are on the end-grain edge of the wood there is no shrinking in the joints to be provided for, while the materials that enter into its composition are so incorporated with one another that they preserve their condition even when bent into the form of an arch. The following are a few of the advantages of "Compoboard":—Primarily it is of value by reason of the quickness with which alterations and repairs can be executed with it. Compared with plastering, which causes stoppage of work and consequent disarrangement of business, "Compoboard" offers great advantages, and for this reason, if for no other, it has been largely used in repairs, &c., to shops, hotels, restaurants, offices and workshops. It can be fixed quickly by nailing into position and immediately after may be distempered, painted, covered with wallpaper, Lincrusta, Anaglypta or other hanging. Vibration caused by machinery or by the tramping of feet overhead naturally cracks plaster and causes it to fall, and dust finds its way through matchboarded ceilings, both of which troubles are avoided by the use of "Compoboard," which has also found a ready use in temporary wood and iron buildings or where plaster is difficult to obtain or materials for plastering are not available. It is quite sanitary and does not harbour

vermin or decay. On this account it has been frequently used in hospitals. The illustration on this page shows its application to the walls and ceiling of the Fredericsberg Hospital, Denmark. Especially noteworthy is the fact that a fire-resisting "Compoboard" is now being made of non-flammable wood, thus overcoming another objection to matchboarding and lath and plaster. The uses of the material are multitudinous, and as exemplifying this we would refer readers to the illustrated catalogue issued by the British Compoboard Co., Ltd., of 18, Roscoe Street, Golden Lane, London, E.C., which will be sent free on application.

Roof Ventilators.

The question of ventilation has come very much to the front of late, though attention has been more particularly directed to the plenum system and its adoption in hospitals and other buildings. The subject is one which, by its very nature, must always engender various differences of opinion, air being so changeful a medium and so little understood as yet, except for its ordinary physical manifestations and its main constituents. There are, however, many established facts about it which cannot be gainsaid: thus, everyone knows that heated air rises and that consequently, in an everyday place, the vitiated atmosphere will collect towards the ceiling or roof, while, at the same time, the heavier carbonic acid gas will descend to floor level. But in providing openings in the roof for the outlet of the heated vitiated air the problem of draughts has to be met, and also, from an architectural point of view, it is necessary to devote special care to the design of the ventilator, which generally forms a prominent part of the skyline. Several examples of such well-designed ventilators are now before us in the supplementary catalogue issued by Messrs. John King, Ltd., of Benson Street,

Liverpool. These are guaranteed absolutely proof against rain, hail or snow, and afford the greatest outlet area with the largest extractive capacity. Of the eight designs illustrated, every one is better than what we are unfortunately accustomed to see fixed on the roof top, and, moreover, the ventilators are moderate in price, varying from £1 4s. for an extract pipe of 8in. diameter to £24, £28, £35 and £37 for one of 40in. diameter. All are of galvanized steel, painted. Messrs. King also supply fresh-air inlet panels, brackets and tubes, similarly efficient in use and cheap in price. The brackets and tubes are fitted with regulating valves and air-filters, and deflecting shields can be had if required. Another speciality of the firm is the Rex "Invisible" roof ventilator, intended for those who wish to have ventilators that will be out of sight; they are made for open or ceiled roofs and can be connected by a shaft to a panel in the ceiling.

The Society of Engineers visited the shipbuilding and engineering works of Messrs. Yarrow & Co., at Poplar, on Wednesday last. The main workshop consists of four bays, each 360ft. in length. There are two engineers' shops, 50ft. and 36ft. wide respectively; a light machine shop, a heavy machine shop, a pattern makers' and a joiners' shop; together with a large boiler-makers' shop and an extensive shipbuilding department. Electrical driving has been adopted in the works, and each line of shafting is driven by its own motor: the shafting being of 3in. diameter and running at 140 revolutions per minute. The larger machines which are not continuously at work are driven by independent motors. Over the boiler-house is a cast-iron tank in which the drainage from the main roofs is collected and used for condensing purposes, an economy in the use of the town water thus being effected.

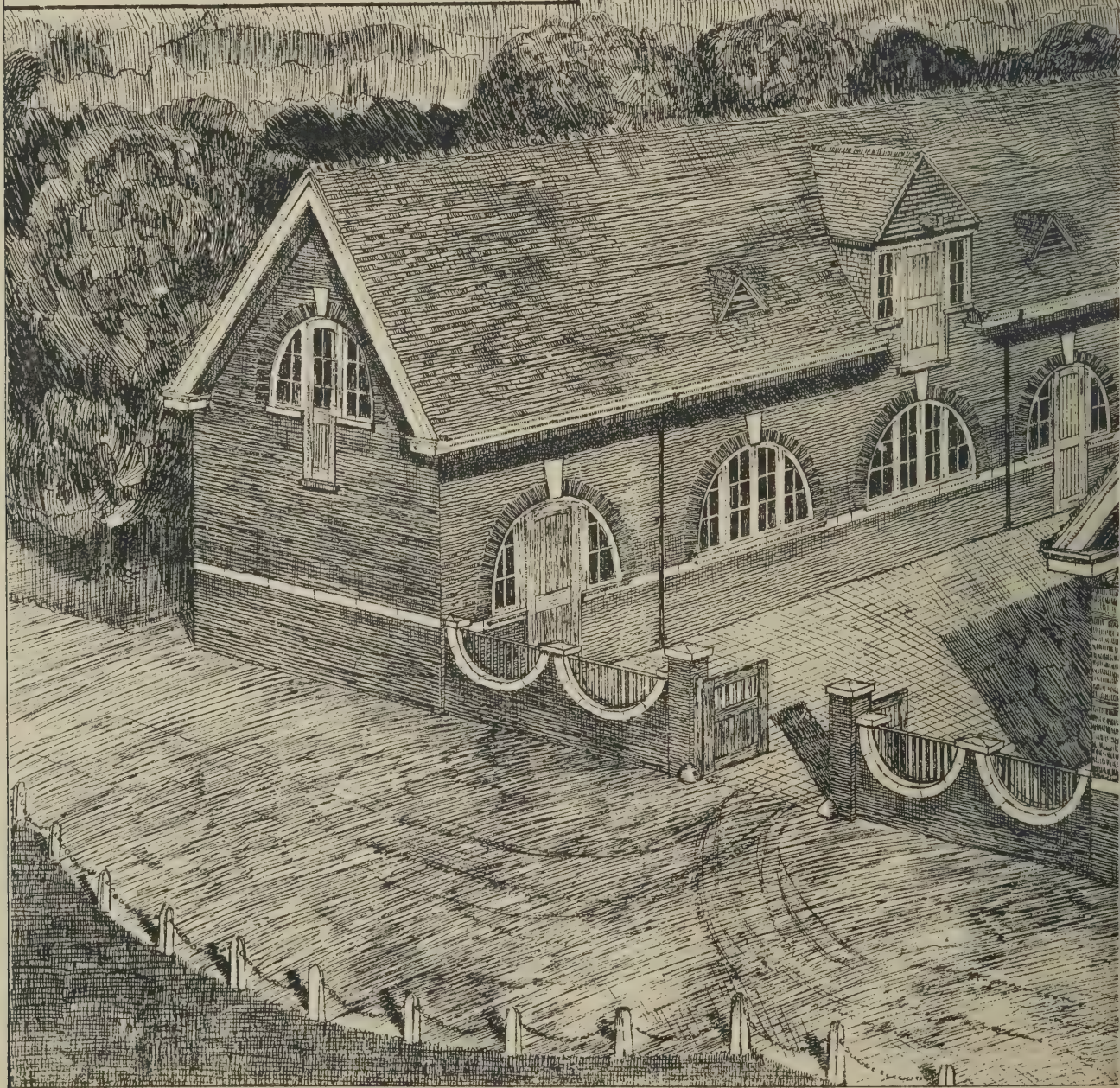
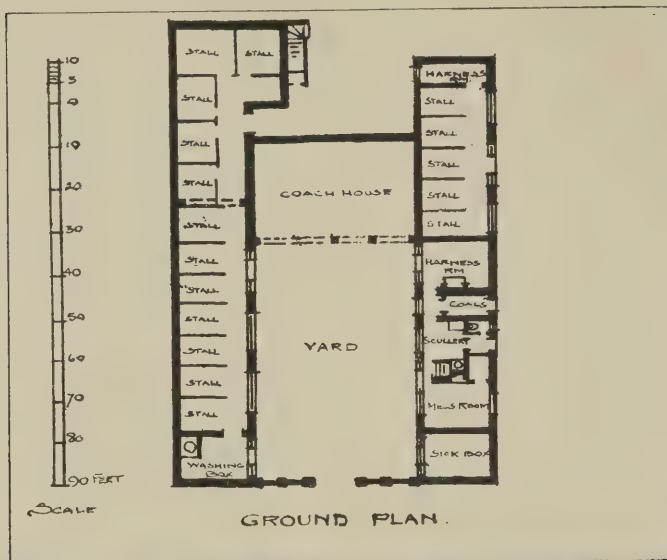


ROOM IN FREDERICSBERG HOSPITAL, DENMARK. WALLS AND CEILING LINED WITH COMPOBOARD.

Complete List of Contracs Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Aug. 4	Buckie, Scotland—Caretaker's House at Cemetery	Corporation.. ..	James D. Geddes, 13 East Church Street, Buckie.
" 4	Doncaster—Coal Store at Gasworks	"	R. Watson, Engineer and Manager, Gasworks, Doncaster.
" 4	Fanad Head, Milford, Ireland—Coastguard Station	"	Office of Public Works, Dublin, and District Office of Works, Londonderry.
" 4	Leftwich, near Northwich—Infectious Diseases Hospital ..	Hospital Committee	J. Cawley, Central Chambers, Northwich.
" 4	Pontardulais—Boundary Walls, Gates, &c., at Cemetery ..	Burial Board	J. White, Cascerigg, Pontardulais.
" 5	Jury's Gap, near Rye, Sussex—Coastguard Buildings	Admiralty	Director of Works Department. Admiralty. 21 Northumberland Avenue, W.C.
" 5	Yealmlton and Newton Ferrars, Devon—Rebuilding Bridge ..	Devon County Council	F. W. Cleverton, 4 Buckland Terrace, Plymouth.
" 5	New Tredegar, Mon.—Dwelling-house	"	G. Kenshole, Station Road, Bargoed.
" 6	Deri, Cardiff—House, Shop, &c.	"	J. Llewellyn Smith & Davies, Architects, Aberdare.
" 6	Deri, Cardiff—Thirty-five Houses	Building Club	J. Llewellyn Smith & Davies, Architects, Aberdare.
" 6	Bourne, Lincs—Timber Construction of Bridges and Viaduct ..	Urban District Council	F. G. Shilcock, Council's Surveyor, Bourne.
" 6	Weston-super-Mare—Lavatories at Hospital	Corporation.. ..	Hans Price & W. Lane, Architects, Weston-super-Mare.
" 6	Scarborough—Rebuilding Health Department Offices	"	Harry W. Smith, Borough Engineer and Surveyor, Town Hall, Scarborough.
" 7	Blackhill, Durham—Alterations to Church Premises	Committee	S. McClure, 21 Cort Street, Blackhill.
" 8	Trealaw, Glam.—Residence and Ten Cottages	"	Arthur O. Evans, Architect, Pontypridd.
" 8	Vaynor, Wales—Renovating Parish Church	"	W. Skym, Dolycoed House, Vaynor.
" 8	Vaynor, Wales—Alterations to National School	Managers	Schoolhouse, Pontsticill, Vaynor.
" 8	Cardruff, Ireland—Renovating Manse	"	T. Houston, Kingscourt, Wellington Place, Belfast.
" 8	Cwmfrwdoer, near Pontypool—Classroom	School Board	Lansdowne & Griggs, Architects, Newport, Mon.
" 8	Kilronan, co. Galway—Stores and other Buildings on Pier ..	Congested Districts Board for Ireland.	J. A. Grant, Galway.
" 8	Lewes—Repairs to Bridge	Trustees of Newhaven Harbour	F. Holman, 86 High Street, Lewes.
" 8	Navan and Kells, Ireland—Goods Offices at Stations	G.N.R. Co. (Ireland)	W. H. Mills, Engineer-in-Chief, Amiens Street Terminus, Dublin.
" 8	Leeds—Lavatory and Sanitary Blocks at Workhouse	Guardians	T. Winn & Sons, Architects, 92 Albion Street, Leeds.
" 8	Weymouth—School	Education Committee	Crickmay & Sons, Weymouth, and 13 Victoria St., Westminster.
" 9	Usk, Mon.—Repairs to Rectory, &c.	"	Dashwood Caple, Architect, Cardiff.
" 9	Halifax—Shops, &c.	"	W. Clement Williams, 29 Southgate, Halifax.
" 9	Leigh, Lancs—R-building Bridge	Main Roads & Bridges Committee	County Bridgemaster's Office, Preston.
" 9	North Cheam, Surrey—Repairs to Small-pox Hospital	Hospital Board	R. M. Chart, Union Bank Chambers, Croydon.
" 9	Tinklers Bridge, near Croston, Lancs—Rebuilding Bridge ..	Main Roads & Bridges Committee	County Bridgemaster's Office, Preston.
" 9	Barming Heath, near Maidstone, Kent—Additions to Asylum ..	Kent County Asylums Committee	W. J. Jennings, 4 St. Margaret Street, Canterbury.
" 9	West Didsbury, Lancs—School	Education Committee	Ernest Woodhouse, 83 Mosley Street, Manchester.
" 10	Fulham, S.W.—Covered Way	Guardians	E. J. Mott, 75 Fulham Palace Road, Hammersmith, W.
" 10	Lambeth—Converting Infants' Block into Receiving Ward ..	Guardians	Clerk, Guardians' Offices, Brook Street, Kennington Road, S.E.
" 12	Bagshot—School	Surrey Education Committee	Jarvis & Richards, 36 Victoria Street, Westminster.
" 12	Huddersfield—Hippodrome	Northern Theatres Co., Ltd.	W. Cooper, 4 Kirkgate Buildings, Huddersfield.
" 19	Alderney, Channel Islands—Coastguard Buildings	Admiralty	Superintending Civil Engineer, H.M. Breakwater, Portland.
" 19	Whitlands, Devon—Coastguard Houses, &c.	Admiralty	Superintending Civil Engineer, H.M. Breakwater, Portland.
" 16	Perth—Tramcar Depot	Corporation.. ..	J. Begg, Town Clerk, City Chambers, Perth.
" 18	Poulton, Cheshire—Boundary Wall at Gasworks	Urban District Council	J. H. Crowther, Gasworks, Poulton.
" 20	Cloughjordan, co. Tipperary—Bell-tower to Church	"	Parochial House, Cloughjordan.
" 23	Liverpool—Sorting Office	Commissioners	Secretary, H.M. Office of Works, Storey's Gate, London, S.W.
Sept. 2	Lowestoft—Covered Markets, Pump House, &c.	Great Eastern Railway Co.	Engineer, Liverpool Street Station, E.C.
" 6	Ponders End—Additions to School	Enfield Education Committee	G. E. T. Laurence, 22 Buckingham Street, Adelphi, W.C.
" 6	Ponders End—Block of Schools	Enfield Education Committee	G. E. T. Laurence, 22 Buckingham Street, Adelphi, W.C.
No date	Southampton—Rebuilding Premises	" Hampshire Advertiser" Printing and Publishing Co., Ltd.	W. B. Hill, 81 Above Bar, Southampton.
"	Hull—Seven Shops and One House	"	Ernest Whitlock, 25 Scale Lane, Hull.
ENGINEERING:			
Aug. 4	Newcastle-upon-Tyne—Electric-Light Installation	Guardians	Newcombe & Newcombe, 83 Pilgrim Street, Newcastle-upon-Tyne.
" 4	Aylesbury—Laying Cast-iron Pipes	Bucks C.C. Highway Committee	R. J. Thomas, County Surveyor, Aylesbury.
" 6	Alford, Lincs—Four Artesian Wells	Urban District Council	Frank Massie, A.M.I.C.E., Tetley House, Wakefield.
" 6	Kelso—Waterworks	District Committee	David W. B. Tait, District Clerk, Kelso.
" 6	Lowestoft—Two Timber Spur Groynes	Town Council	G. H. Hamby, Borough Engineer, Town Hall, Lowestoft.
" 6	Neath—Colliery Arching	"	Evans & Bevan, Colliery Proprietors, Neath.
" 8	Madrid—Improving Waterway, &c.	Spanish War Office	Commercial Intelligence Branch, Board of Trade, 73 Basinghall Street, E.C.
" 8	London, N.—Coal Bunker at Electric-lighting Station	Hornsey Town Council	E. J. Lovegrove, 93 Southwood Lane, Highgate, N.
" 8	Glasgow—Electric-light Installation at Library	Corporation.. ..	James K. Rhind, 67 Hope Street, Glasgow.
" 10	Chippenhams, Wilts—Pumps, Gas Engines, &c.	Urban District Council	A. E. Adams, Waterworks Engineer, Council Offices, Chippenhams.
" 10	Macclesfield—Sewage Tanks, &c.	Corporation.. ..	R. E. W. Berrington, Engineer, Bank Buildings, Wolverhampton.
" 10	Beverly—Fire Appliances	Asylum Visiting Committee	Maxted, Knott & Coles, Burnett Avenue, High Street, Hull.
" 11	Portland Bill, Dorset—Lantern on Lighthouse	Corporation of Trinity House	Trinity House, E.C.
" 11	Fulham, S.W.—Iron Fire-Escape Staircases, &c.	Guardians	A. Saxon Snell, 22 Southampton Buildings, W.C.
" 12	London, S.W.—Permanent Way Materials	"	Crown Agents for the Colonies, Whitehall Gardens, S.W.
" 15	Carshalton—Fire Appliances	Urban District Council	W. W. Gale, Council's Surveyor, District Council Offices, High Street, Carshalton.
" 15	Leeds—Alternators, &c.	Corporation.. ..	J. B. Hamilton, Standard Buildings, City Square, Leeds.
" 15	Glasgow—Branch Railway	Glasgow and S.W.R. Co.	Engineer's Office, St. Enoch Station, Glasgow.
" 16	Perth—Electric Tramways	Corporation.. ..	J. Begg, Town Clerk, City Chambers, Perth.
" 16	Richmond Dublin—Reservoir, &c.	Asylums Committee	J. H. H. Swiney, M.I.C.E., Avenue Chambers, Belfast.
" 24	Penang—Tramcars	Municipal Council	Preece & Cardew, 8 Queen Anne's Gate, Westminster.
Sept. 1	Leeds—Reservoir	Corporation.. ..	City Engineer's Office, Municipal Buildings, Leeds.
" 2	Lowestoft—Quay Walls, Roads, Water Service, &c.	Great Eastern Railway Co.	Engineer, Liverpool Street Station, E.C.
Oct. 4	London, S.W.—Pumps, Motors, &c.	London County Council	County Hall, Spring Gardens, London, S.W.
No date	Bolton-on-Swale—Renovating Heating Apparatus in Church ..	"	Rev. D. Mallinder, Scorton Vicarage, Darlington.
"	Bristol—Railway Siding, &c.	Avonside Engine Co.	E. W. Walker, Bristol.
FURNITURE:			
Aug. 20	Downpatrick—Furniture	Down District Lunatic Asylum	Samuel Rea, Clerk, Asylum, Downpatrick.
IRON AND STEEL:			
Aug. 9	London, W.—Steel Bridge Girders	G.W.R. Co.	Engineer, Paddington Station.
" 18	Rio-de Janeiro—Fishplates, &c.	Central Railway of Brazil	Central Railway of Brazil, Rio-de Janeiro.
" 30	Amsterdam—Asphalted Cast-iron Water Mains	"	Ministry of the Colonies, The Hague.
PAINTING AND PLUMBING:			
Aug. 4	London, N.—Whitewashing School	Guardians	Master, Guardians' School, Hornsey Road, N.
" 6	Hull—Painting Infirmary Wards and Relief Offices	Guardians	T. Beecroft Atkinson, 11 Trinity House Lane, Hull.
" 8	Nottingham—Painting Town Property	Corporation.. ..	City Architect's Office, Nottingham.
" 8	Nottingham—Painting Ironwork of Trent Bridge	Estates Committee	City Architect's Office, Nottingham.
" 10	Gillingham, Kent—Painting Fence	Corporation.. ..	Borough Surveyor's Office, Gillingham.
" 11	Cork—Painting at Infirmary and Hospital	"	House Surgeon, County Hospital, Cork.
" 19	Londonderry—Sanitary Plumbing at New Buildings	Asylum Committee	M. A. Robinson, Richmond Street, Londonderry.
" 20	Bermondsey—Painting, &c., at Guardians' Offices	Guardians	Newman & Newman, 31 Tooley Street, London Bridge, S.E.
" 25	Rotherhithe—Painting, &c., at Wharf	Metropolitan Asylums Board	Offices of the Board, Victoria Embankment, E.C.
ROADS AND CARTAGE:			
Aug. 4	Ferry Moor Common, Yorks—Footpath	Corporation.. ..	Mr. Dixon, Grimethorpe Hotel, Ferry Moor Common, Yorks.
" 4	Leeds—Paving	Urban District Council	City Engineer's Office, Municipal Buildings, Leeds.
" 4	Hindley, Lancs—Street Works	Urban District Council	A. Holden, Surveyor, Council Offices, Hindley.
" 8	Slaithwaite—Macadam	Urban District Council	E. Gledhill, Slaithwaite.
" 8	Dewsbury—Paving, Flagging, &c.	Corporation.. ..	Borough Surveyor, Town Hall, Dewsbury.
" 8	Herne Bay—Materials	Urban District Council	F. W. J. Palmer, Council Offices, Herne Bay.
" 8	London, N.—Wood Paving	Hornsey Town Council	E. J. Lovegrove, Southwood Lane, Highgate, N.
" 9	Wellingborough—Granite	Urban District Council	J. T. Parker, 29 Church Street, Wellingborough.
" 9	Amble—Paving	Urban District Council	W. Gibson, Surveyor, Amble, Northumberland.
" 18	Poole—Road and Sewer Works	Corporation.. ..	J. Elford, Borough Surveyor, Poole.

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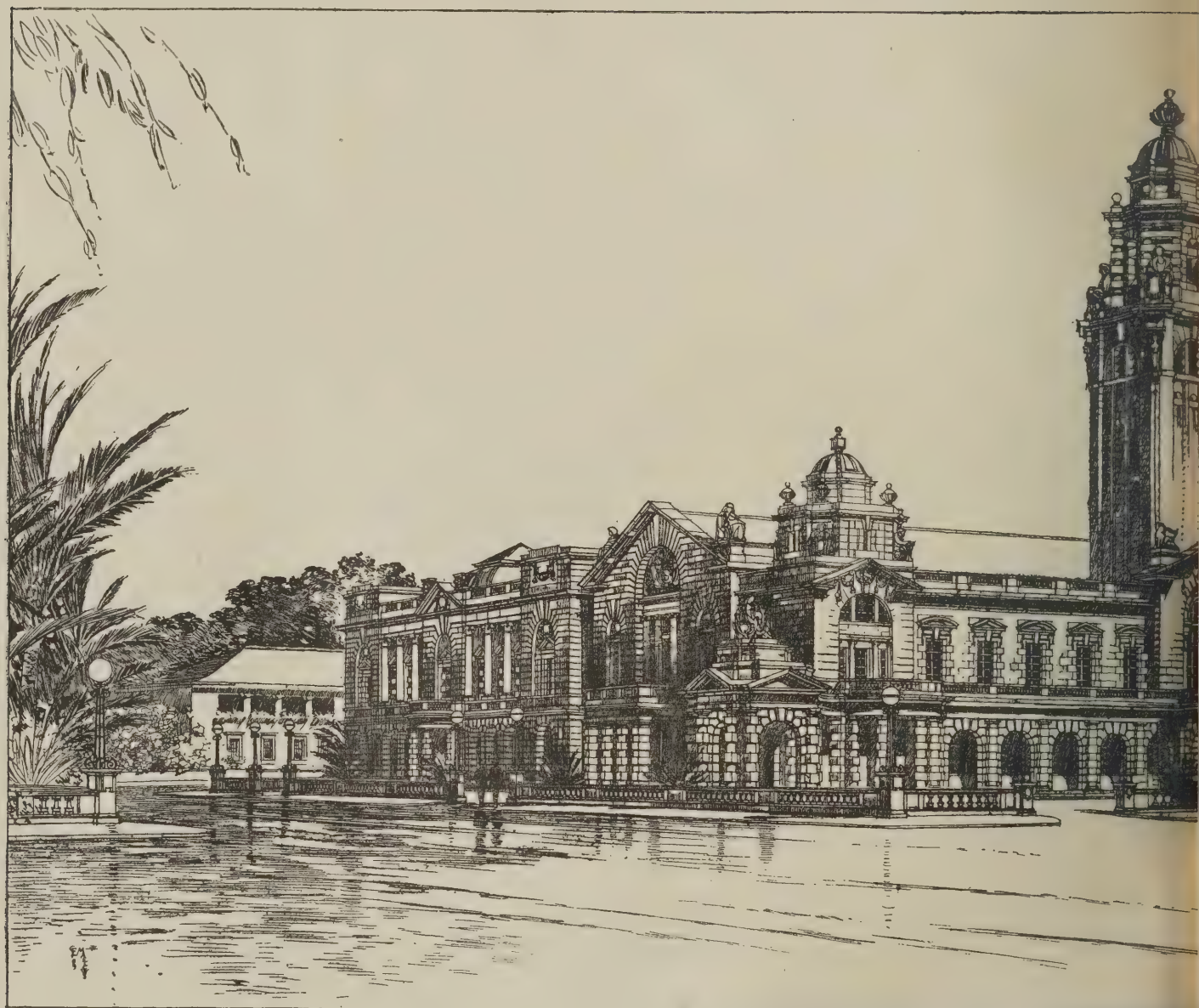
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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, August 10th, 1904.



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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

August 10, 1904. Vol. 20, No. 496.

6, Great New Street, Fetter Lane, E.C.

Summary.

A departmental committee appointed to report on the Workmen's Compensation Acts recommends that the limitations in respect of employment on, in or about any building as regards height, use of scaffolding and employment of machinery, be repealed. Section 4, relating to sub-contracting, is also recommended to be amended and "engineering work" to be extended so as to include road-making and mending, well-sinking and repairing and other excavation. (Page 69.)

The new Vauxhall Bridge is to be completed by the end of 1905. (Page 74.)

In the important light and air case of *Kine v. Jolly*, Mr. Justice Kekewich decided last week that the obstruction of light to the morning-room and hall of a house by the erection of another house was a "nuisance," consequently giving the plaintiff cause for action, and he ordered the defendant to pull down so much of his house as caused this "nuisance." The case is based on the judgment given in *Colls v. Home and Colonial Stores*. (Page 73.)

Mr. J. J. Burnet will prepare the design for extensions to the British Museum. (Page 74.)

The list of next session's papers at the Architectural Association meetings is given on p. 76.

A monument to the Royal Artillery who fell in South Africa is to be erected opposite the Guards' memorial in Waterloo Place. (Page 74.)

A valuable book of formulæ, calculations and sizes of British standard sections has just been issued by the Engineering Standards Committee. (Page 67.)

The chief feature which distinguishes the motor house from other buildings is the planning of the floor. Whatever the size of car to be housed, a pit must be provided for cleaning and inspection purposes. (Page 68.)

The Manchester sewage works at Davy-hulme comprise 46 acres of ground, 25½ of which are occupied by contact beds in operation; 9 more are complete and will be put into use almost immediately; and the remaining 11 should be at work before the end of the year. Two-thirds of the sewage (including storm-water) is now purified, at any rate to the point of being rendered non-putrefactive. (Page 67.)

The L.C.C. Building Sites. FOR more than two years the important "island" site in the Strand has remained unoccupied, at no little cost to the ratepayers, and unless the Council find further refuge in Salvationists again, or even in roundabout and menagerie proprietors, it seems probable that considerable additional loss will be incurred before the building owner arrives on the scene ready to pay a large rent and spend £100,000 or so on the buildings. The suggested invasion by American or Continental speculators will not make London men any more in a hurry to seize the opportunity afforded, but much may be expected of the extended lease now granted. When land like this is put up to auction several times, and not a single bid is made for it, something clearly must be amiss, and we find the source of all the trouble in the conditions. There is no great inducement in inviting people to put up costly buildings for eighty years, to pay a big ground rent, and to be hedged about with conditions which, if infringed, will allow the Council "by resolution under their common seal to put an end to the contract, to resume possession of the land, and to appropriate all the buildings standing upon it." The extension of the lease is a considerable improvement, but, much as we should like to see the place covered with monumental buildings, it seems probable that further concessions by the Council will yet be needed before the auctioneer can take upon himself the virtues of the profitable servant. The system of land tenure in this country is what it is, and is likely to remain, but it is interesting to remember what conditions obtain in other countries. As our contemporary the "Statist" observes: "Both on the continent of Europe and throughout the States of America building leases are so unknown that the expression would be almost incomprehensible; for in those countries the first step a man takes with a view to the erection of a building is to purchase the land upon which that building is to stand, as the erection of some important block of premises on somebody else's land would be regarded as merely folly. Herein may be seen one of the main objections to the Council's land; for although our building customs are so well known throughout the country that their manifest absurdity often passes without notice, yet in cases like this, where a man is required to expend a large fortune in erecting buildings, he is apt

to consider more carefully the terms of the proposed lease—and there is no question that a term of eighty years is far too short when such a large outlay is suggested. The Council stipulate, in effect, that the buildings to be erected shall last for centuries, but they will only allow the builder a term which would enable them to retake possession of that building even before the expiration of the present century, and in the meantime they require the payment of a ground rent which, according to the information available, though no definite sum has been announced, would be about £24,000 per annum . . . The practice frequently adopted in the past by the Corporation of London seems far more likely to secure the desired end. Much of Bond Street belongs to the City, and the leases under which it is let give the tenants the right of renewal in perpetuity at the existing rent, subject to the payment of a fixed fine at stated periods. This system enables the Corporation to remain in possession of the freehold; it makes their rent perfectly secure; and it enables the tenant and his successors to remain in possession of a building which is not constantly decreasing in value owing to the approaching determination of a ground lease. Unless the Council adopt more reasonable views it is highly probable that the land will continue on their hands, for no English capitalists, or American either, will take a site if they cannot have something approaching a free hand in the erection of buildings"—with which we agree, though we think the Council are quite right in asserting some control over that "hand." The site is too important to be covered with commercial hotchpots, however profitable financially. It should not be forgotten that this clearance and the new thoroughfare to Holborn constitute a vast improvement, and it is a foolish policy to try to make the whole scheme pay for itself by imposing abnormal rents. Far better reduce these so as to induce prospective investors to go to the expense of erecting the buildings desired by the Council. Of course the whole affair has been more or less of a fiasco, beginning with the futile competition for the treatment of the "island" and crescent, but we trust that the Council will eventually make something satisfactory out of it and not allow so fine an opportunity for architectural treatment to pass into the hands of money-making jobbers.



LODGE AT PEMBURY, KENT. C. E. MALLOWS AND GROCOCK, ARCHITECTS.
(Royal Academy Exhibition, 1904.)

SANITARY INSTITUTE CONGRESS.

IN our issue for last week we published a report of the proceedings of the Sanitary Institute Congress at Glasgow up to and including Thursday, July 28th, being obliged to hold over our report of the concluding meetings on Friday. This we now give.

The subject mainly concerning our readers was that of the treatment of sewage, discussed at a joint meeting of the sections devoted to Engineering and Architecture and Physics and Chemistry, over which Professor Clowes presided.

Sewage Effluents.

Professor Dunbar (Hamburg) read a paper in which he described the different standards in use for ascertaining the purity of sewage effluents. The conclusions to which he came were that the absolute figures obtained even by the best methods of determining putrescible matter in sewage do not in all cases give definite indications as to the putrescibility of any given sample. Effluents of purification works may present a most satisfactory character, and yet under certain circumstances contain as large or even larger quantities of either organic carbon, organic nitrogen and albuminoid ammonia, as high an oxygen absorption, and loss of ignition as other samples of crude sewage which are in a high degree liable to undergo putrefaction. We should, therefore, give up the attempt to find a standard of general applicability based on absolute figures. A far safer judgment as to the putrescibility of effluents could be obtained by calculating the percentage of purification effected. The requirement that all effluents should be absolutely non-putrescible needed only to be made where the river presented most unfavourable conditions or where the river districts were densely populated. In many cases it would be sufficient to require only that all coarser suspended matter be removed from the sewage. In other instances all suspended matter, including finer particles, should be removed as efficiently as possible. In other cases, again, the authorities would have to insist not only on the removal of the entire suspended matter, but also on a reduction of between 40 and 50 per cent. of oxygen absorbed by the dissolved impurities, the determination being made after filtering the samples; and there would certainly be such cases, too, where it must be stipulated that the effluents are limpid and entirely non-putrescible.

The president, in summing up the discussion which followed, said there seemed to be a consensus of opinion that the effluent going into streams should be free from suspended matter, and that there should not be any hard-and-fast line fixed in regard to the chemical quality. He believed they were coming more and more to consider that the incubation test was perhaps the most important as to the suitability of an effluent being run into a stream.

Septic Tank Treatment.

Mr. William Shanks submitted a paper on six years' experience of the septic tank sewage-disposal system in operation at Barrhead. The works, which were opened on June 15th, 1899, were designed to serve a population of 10,000, with a maximum sewage flow of 400,000 gals. per day. The system deals with domestic sewage and a proportion of roof water only. Surface water and manufacturing effluents discharge direct into the stream. The works consist of two grit-chambers, four septic tanks and eight filters. The total filtering area is about 2,540 sq. yds. Alternation of filters is accomplished by means of the automatic gearing supplied by the Septic Tank Syndicate. A man is kept on the works (at a cost of £60

per annum) to keep them in order and to keep the gearing clean. The total cost of the works was about £6,776. The present sewage rate is 10d., but less than one-third of this is applicable to purification works. The total working expenses, repairs, &c., amount to about £80 per annum. The assessable rental in Barrhead is £33,000. The bulk of the rate is absorbed in interest and repayment of capital. After the capital is repaid the sewage would be purified at something like 4d. per £1 per annum. The works have not lost efficiency during the past six years. Analyses were given showing the satisfactory nature of purification and continued efficiency of the works.

Manchester Sewage System.

Dr. Gilbert J. Fowler gave an account of recent experience in the treatment of Manchester sewage. He described the works, stating that at the present time there are at Davyhulme 25½ acres of contact beds in operation, and about 9 acres more are complete and will be put into use almost immediately. The remaining 11 acres out of the total of 46 should be at work before the end of the year. The whole 27 acres of storm-beds have been in operation for some time. Three new septic tanks are nearly complete, and progress is being made with the extension of the channel intended to convey the filtrate from the primary beds to a limited area of secondary beds. At the present time two-thirds of the whole of the sewage of Manchester, including storm-water, is purified, at any rate to the point of being rendered non-putrefactive. The total volume of sewage filtered by the various beds during the year has amounted to 5,654,872,456 gals., or 43 per cent. of the total quantity of sewage received at the works. The total cost for labour and incidental expenses, including the whole of the expenditure in connection with the experimental beds, has amounted to £1,050, or 3s. 8.6d. per million gallons actually filtered. In judging of the success or otherwise of a sewage purification works, the author said it was necessary not only to consider the purity of the final effluent but also the cost involved in its production. There was no reason, to take an extreme case, to strive to obtain the same state of purity in an effluent flowing into a tidal river as was required for one which entered a drinking water stream. In deciding between the relative merits of two processes it was sometimes found that a small superiority in the effluent obtained in the one case was accompanied by an altogether disproportionate cost. *A priori* arguments were therefore of little use in forming a judgment.

Mr. W. C. Tyndale (London) read a paper on the disposal of sewage on chalk soils, and Mr. Arthur F. Somerville (Somerset County Council) one on the pollution of rivers by the sludging of mill dams.

At the closing general meeting held on the Friday afternoon Mr. Whitaker (London), chairman of the Council of the Institute, said the Congress had been a very successful one.

Mr. White Wallis, secretary of the Institute, said the attendance had been between 1,500 and 1,600; the attendance at the municipal representatives' conference on the first day being quite exceptional in the history of the Congress.

Another City Church to be Demolished.—A commission appointed by the Bishop of London has reported in favour of demolishing the Church of St. Thomas, Charterhouse, on account of the diminished population, and recommends that the benefice be united with the adjoining parish of St. Mary, Golden Lane. The site will be sold, and it is hoped with the proceeds to erect at least two churches in the suburbs.

Views and Reviews.

A new Book on Haddon Hall.

In our own pages Mr. Cheetham has written about Haddon Hall on more than one occasion, and our readers will be familiar with his work. He is also the author of "Architectural and Historical Notes on Haddon Hall." One would think that, so much having already been published, there could be no reason for another book on the subject. Mr. Cheetham, however, explains in the preface. His new book does not aim at presenting a detailed archaeological description of Haddon Hall, but merely seeks to supply visitors with an accurate and well-illustrated guide-book. Nothing new is stated in it, but the information has been collected from sources that are scattered and not easily accessible to those for whom the book is primarily intended: added to which, of course, is Mr. Cheetham's own extensive knowledge of the building. The book is well got up, authoritative, and very good value for half-a-crown. We can strongly recommend it.

"Haddon Hall," by F. H. Cheetham. London: Sherratt & Hughes, 65, Long Acre, W., price 2s. 6d. nett.

British Standard Sections.

The latest publication of the Engineering Standards Committee is this book of formulae, sections and sizes. Though only a small book, its preparation has entailed a vast amount of labour, and no pains and expense have been spared to ensure the accuracy of the results given. The general preface gives an idea of the method adopted in arriving at the list of standard sections, and the mathematical preface contains useful information on moments of inertia, ellipse of inertia, moments of resistance, &c. All the formulae upon which the calculations were made were drawn up by Mr. Max am Ende, of the Calculation Committee. The volume will be welcomed by all engineers, architects and contractors.

"Properties of British Standard Sections." London: Crosby Lockwood & Son, 7, Stationers' Hall Court, Ludgate Hill, E.C., and the Engineering Standards Committee, 28, Victoria Street, Westminster, price 5s. nett.

Sea Coast Works.

This is a reprint of four articles which appeared recently in "Public Works." It is well produced and illustrated and will be read with interest. The author suggests that as the matter is clearly one of national importance the Government might well consider the question of establishing a properly appointed Department of State which could devote its whole attention to scientific enquiries and investigations. "At present there are several Departments which deal with foreshores and harbours—amongst them the Board of Trade, Board of Agriculture, Woods and Forests, Treasury and Admiralty. It seems possible that there is work enough to give one Department plenty to do, and the establishment of such a Department is what I have strongly advocated for several years past."

"Sea-Coast Erosion and Remedial Works," by R. G. Allanson-Winn, M.I.C.E.I. London: St Bride's Press, Ltd., 24, Bride Lane, Fleet Street, E.C., price 1s. nett.

Timber; Builders' Hoisting Machinery; Builders' Bookkeeping.

These three small books are the first of a new series which Messrs. Cassell propose to issue. Compiled from articles in "Building World," they do not pretend to be complete treatises, but simply handbooks giving a great deal of practical information in a concise and cheap form; and as such they will appeal to many. They are very neatly produced and well illustrated.

"Timber," "Single-Entry Bookkeeping for Builders," "Builders' Hoisting Machinery," edited by Paul N. Hasluck. London: Cassell & Co., price 6d. (nett) each.

SOME NOTES ON MOTOR HOUSES.

By B. WYAND.

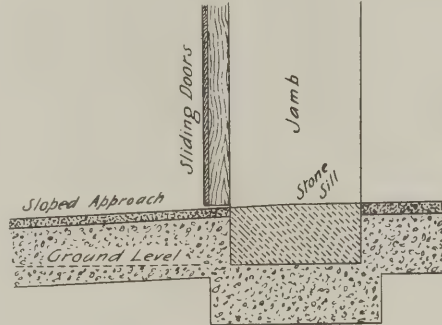
WITH the swift strides made in the automobile industry during the last few years the demand has arisen for a class of building unthought-of a decade ago; and there will soon be but few architects in general practice who will not at one time or another have been called upon to prepare plans and specification for a motor house. At this early stage no settled definite planning has been arrived at; much that has been done must be looked upon as merely tentative; and I would therefore ask the reader to remember that I put nothing forward as final, preferring my remarks to be treated simply in the light of suggestions, from which (in combination with the opinions and experience of others) some settled lines may in due course be evolved.

It is scarcely necessary to say that nothing of a temporary nature should be deemed good enough for the stabling of a motor car. Wood and corrugated iron buildings, whether portable or fixed, are both unsuitable for the purpose, warmth, dryness and approximate equality of temperature being of first importance in the preservation of a car. It is a poor policy to risk the well-being of a vehicle costing hundreds in order to save a few pounds on the structure in which it is to be housed, and beyond this there is the question of personal safety, which may be seriously imperilled in consequence of the rusting of parts of the machinery or the action of damp upon the fabric of outer covers and the rubber of inner tubes.

With the style of building I have no concern, that being entirely a matter for the individual architect; neither am I concerned with the materials to be employed for walls and roofs so long as they are lasting and thoroughly wind, weather and damp-proof. The walls internally may be finished with struck-jointed brickwork or they may be plastered; but the best finish is of course

given by some form of tiling, with a dado of enamelled bricks for the harder wear in the lower portions of the walls. Roofs should be boarded and felted and should, if possible, have neither rooms nor loft above so that plenty of top light may be obtainable.

In place of the obsolete coach-house doors, steel-hinged wood revolving-shutters or sliding doors should form the entrance, as with these there is no danger of damaging the car by the swinging of a hung-door in a heavy wind. The doors, if sliding, must

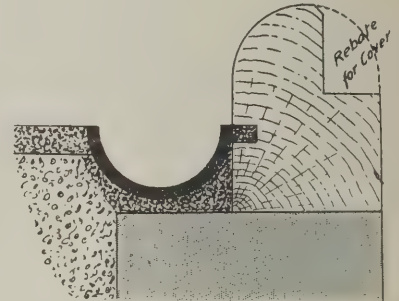


-fig. 1-

run on an overhead track, and all framing should be inside, with flush boarding outside to throw off the wet. A paved approach laid to an easy fall leads to the stone entrance sill, which is on the level of the finished floor surface and about 6in. above the level of the surrounding ground (see Fig. 1).

The chief feature which distinguishes the motor house from every other building is the planning of the floor, and it is in regard to this that great care must be exercised. Whatever the size of car to be housed, a pit must be provided for cleaning and inspection purposes, and it is advisable (though not necessary) in the case of a double motor house to have two pits, one for each car, so as to avoid the frequent changing of position which would otherwise be necessary. I will, however, confine myself to a single pit.

This should be not less than 3ft. wide and 4ft. 6in. deep (see Figs. 3 and 4). Length will depend upon the size of car; but it would be as well to anticipate a little and make it, say, from 9ft. to 12ft.—the latter size being, in my opinion, the maximum requirement for any make of private car. The pit may be brick built with rendered faces, and with floor finished as the floor of the house, and no care or expense should be spared to render it thoroughly watertight. The drain will discharge outside over a



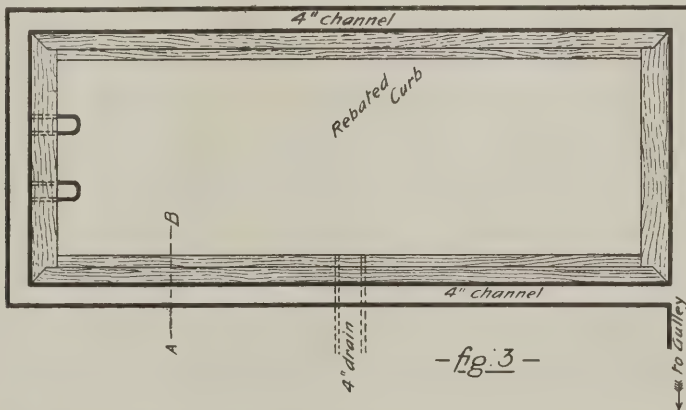
-fig. 2-

trapped gulley, with small inspection pit built up, or an ordinary syphon-pipe with extra inlet carried to ground-level (to form inspection eye) may satisfy local requirements. Around the pit is laid a 7in. by 5in. hardwood curb, securely fixed to the brickwork of the walls, the curbs laid in the direction of the length of the pit being rebated to receive the movable covers (see Fig. 2). The curbing should be laid so as to be 4in. above ground level, as otherwise (i.e., with a flush or nearly flush curb) there is a danger of the car mounting the curb and sustaining serious damage by a fall into the pit. Pit-covers are best made in small light sections, so as to be easily moved, and they must be strongly framed (to take the weight of the heaviest car) and provided with flush handles for lifting. Personally, I do not see the need for a cover at all; but owners seem to like them, and after all it is a matter of small moment. Step irons should be built into the brickwork of the pit for access purposes.

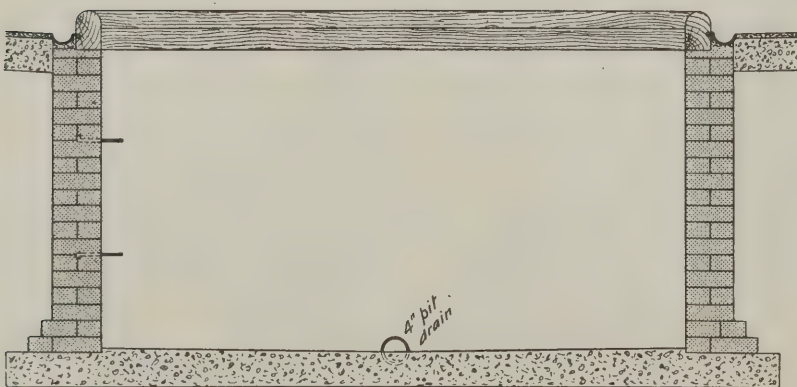
The floor itself may be formed of any non-slippery, impervious and hard-wearing material—asphalt or tiles for preference. Around the pit a 4in. glazed stoneware channel is laid flush with the floor and butting against the wood curbs (Fig. 2), and the floor is best made to fall in every direction to these channel pipes, which discharge eventually in the open over a trapped gulley. With the raised kerb and the channels no trouble can arise from water finding its way into the pit.

Lighting and heating are matters which require more or less special consideration in each case. I have mentioned the importance of plenty of light; in fact, the simplest way is to "pier" the walls and fill in with solid frames and casements, having small top lights to open for ventilation in addition to the casement sashes themselves, which may all be stayed open in favourable weather. The roof-lantern will afford constant ventilation in practically all weathers. Heating is a necessity, whether by hot-water pipes, radiators or open fires—the selection being left to the judgment of the architect, upon a consideration of the most suitable system. The life of a car (and especially of its working parts) is very much prolonged by housing it in a warm, dry, equable atmosphere. Artificial lighting is another matter which must be regulated by local facilities; to discuss it here would be a waste of space.

Lavatory and water-closet should both be provided, together with a wardrobe for motor garments, rugs, &c., and a drying-



-fig. 3-



-fig. 4-

—Scale of Feet—



room—fitted with pegs, battens and slatted shelves—for the reception of the same after a wet run. The drying-room will need to be well ventilated for the escape of moisture, the heating arrangements depending upon those adopted for heating the motor house. A small workshop is a very handy thing to have in connection with the house; but where expense precludes the provision of this a bench (fitted with vice, &c.) should be fixed in one corner of the house, and racks provided for tools, spanners, wrenches, &c. Wooden harness pegs are eminently adapted for spare covers, and a row of these should be placed in some convenient position. Water must, of course, be laid on, and it is a wise plan to have the taps fitted with unions for hose connection. Petrol is best stored with other oils in a separate building (of however rough a nature), detached if possible.

As to the size of the motor house itself, this will again naturally depend upon the size of the car, but ample room must be left to get round on all sides. Excluding the space required for bench, cupboards, lavatory, &c., a safe size for a small car is 14ft. by 14ft., and from this one may go, in the case of larger cars, up to 14ft. by 20ft. It is the biggest mistake in the world to cramp the building, as an extra foot or two by no means entails a proportionate initial cost, whereas structural alterations for the accommodation of a larger car may mean a heavy expenditure.

WORKMEN'S COMPENSATION.

Important Recommendations by a Departmental Committee.

THE departmental committee report on compensation for injuries to workmen, just issued by the Home Office, is a bulky blue-book of more than two hundred pages. It forms a most valuable digest of the present state of the law on the subject and embodies many important recommendations—forty-two in all—several of which directly concern the building trade.

The provision of the Workmen's Compensation Acts with regard to employment in building have given rise to a large amount of most unsatisfactory litigation. The principal difficulties have arisen from the conditions that some part of the building must exceed 30ft. in height; that the process of construction or repair must be "by means of a scaffolding"; the meaning and extent of the word "repair"; and the extent of the operation of the last words of the sub-section which apply the Act to employment on any building in which machinery driven by power is being used for construction, repair or demolition.

The committee do not think it worth while to detail the anomalies which have been brought to their notice as resulting from the operation of the restriction to buildings some part of which exceeds 30ft. in height. This qualification first appeared in the Notice of Accidents Act, 1894, and was imported from that Act into the Factory Act of 1895, and thence into the Workmen's Compensation Act, 1897. This is an instance of the worst type of what is in substance, though not in form, legislation by reference. A qualification which might serve well enough as a necessary condition of the obligation to give notice of an accident, or even of the right to enforce the provisions of the Factory Act, becomes wholly inapplicable when applied as a criterion of a right to secure compensation for injury by accident. A definition intended for one purpose is used for a wholly different purpose. The greatest confusion has been the result and a discreditable amount of litigation.

With regard to scaffolding, the committee observe that it is hardly necessary to multiply instances of the extraordinary distinctions which the Courts have been obliged to recognize between constructions which do and those which do not constitute a "scaffolding." It has been found impossible to lay down anything approaching to a satisfactory principle. The committee think it is absolutely necessary that these distinctions should be removed.

At one time considerable difficulty was felt, and several cases are reported, as to the meaning of the words "being constructed or repaired." It was held that painting or decorating did not constitute repair. The House of Lords, however, in the case of *Hoddinott v. Newton, Chambers & Co.* have taken a very wide view of the meaning of these words. In Lord Macnaghten's words, "construction, repair, demolition—these three operations cover, I think, every varying phase in the life of a building, from its beginning to its end." It appears, therefore, that these words are at present sufficiently comprehensive, but in the event of legislation on this subject it will be a question for consideration, in the light of any decisions which may take place in the meantime, whether any other or additional words are required. Probably it will be found desirable to specifically include decoration.

The remaining anomaly with regard to employment in building is that if there be any machinery on the premises used for the purposes of the work, the employment on the building becomes employment in a factory, irrespective of any question of height or of the presence of scaffolding. Thus a mortar mill, worked by steam on a building estate, makes the employment upon the adjacent building a factory employment, and gives the right of compensation for accident. But employment upon the same building estate a short distance away ceases to be employment in a factory, and there is no right of compensation. Nothing can be more unsatisfactory than such distinctions.

The committee see no effective remedy for these anomalies unless employment in building operations is brought altogether within the Act and the distinctions depending upon height of building, use of scaffolding, employment of machinery and character of work are entirely done away with. Some objections on the part of the employers have been raised to this proposal, and they are not without force. They apprehend great increase of claims for small accidents which ought not to come within the Act.

The committee also think there is force in the objection that in some cases the Act may fail of its operation through small builders neglecting to insure and being unable to satisfy the claim for compensation. This is a danger inherent in the scheme of the existing law, and must be balanced against the advantages on the other side. There is little doubt that the more the operation of the law is understood the stronger the tendency will be to resort to the protection afforded by insurance, which in turn involves its own dangers. On the whole, the committee think the arguments for extending the Act so as to cover all building operations must prevail, and they accordingly make this recommendation: "Building operations should include work upon all erections upon the surface, including the work of preparing for and carrying out the foundations for the erection, and be irrespective of the material used in construction."

Among other recommendations are the following:—

That section 4, relating to "sub-contracting," be amended, care being taken to preserve the existing limitations on the liability of an "undertaker" by reference to the place where the accident happens to the workman employed by the sub-contractor.

"With regard to the question where a series of sub-contractors exists, we think that just as the 'undertaker' is responsible to any workman of any sub-contractor under him, so each sub-contractor who lets out a portion of the work he has contracted to do must be regarded as an 'undertaker' in respect of all workmen employed by any of the subsequent sub-contractors to whom any portion of the work undertaken by him may be let. There remains the question of the right of the 'undertaker' to indemnity from the sub-contractor. We think this right should attach in every case where the 'undertaker' is bound to pay compensation under the Act to a workman employed by or through his sub-contractor."

That the definition of "quarry" be amended so as to include all quarries irrespective of any question as to depth.

That the definition of "engineering work" be extended to include road-making and mending, well-sinking and repairing and other excavation; also employment in the construction or maintenance of telegraphs, telephones and other electric appliances.

Extended reference is made in the report to the question of insurance. Col. Stanley Bird, C.B., chairman of the Builders' Accident Insurance Co., Ltd., stated that the company was formed to insure its members against liability under the Act of 1880. The liability of the members is limited to £1, and the premium before the Workmen's Compensation Act came into force was 4s. per £100 wages. After July 1st, 1898, the premium was raised to 15s., but it has been possible every year to give a rebate to the insurers varying from 20 to 35 per cent., making the actual premium about 10s. per £100.

In a table showing specimens of rates imposed by the Association of Offices, Mr. Stanley Brown gives the following:—Buildings, general, rate imposed by tariff of 1898, £1 17s. 6d.; reduced by tariff committee of 1899, £1 5s. Buildings under 50ft., £1 5s. in the former case, 16s. 8d. in the latter.

Rate per cent. of wages for builders 20s., small builders 15s., charged by the Employers' Liability Assurance Corporation, Ltd., as the result of 4½ years' experience of Workmen's Compensation Acts.

"On the whole we think it is clear (1) that the Act works most unsatisfactorily, and is most ineffective where labour is unorganized and the workman is obliged to resort to legal assistance; (2) that this tendency is aggravated when the workman is in the employment of a small employer without adequate capital or position to dispose him to be careful as to protecting himself by insurance, and (3) that the system is least appropriate in the case of a casual labourer who has no fixed or settled occupation, but merely picks up jobs where he can."

The Proposed Archway in the Mall.—Replying last week to Sir E. Durning-Lawrence, who asked if any decision had been arrived at in connection with a proposal to erect an archway or memorial at the eastern end of the Mall extension to commemorate those who died during the South African war, and whether his Majesty's Government contemplated the erection of any such memorial in London, Lord Balcarras said:—The Government have given very careful consideration to this proposal, but they regret that they are unable to appropriate the archway which is to be erected at the east end of the Mall extension for this purpose. They do not think that it would prove a suitable building for a memorial of this kind; nor can they undertake to find any other site. They are not prepared to say that the proposal for a national memorial in London seems to be generally regarded as desirable.

Bricks and Mortar.

Aphorism for the Week.

The object of science is knowledge; the objects of art are works. In art, truth is the means to an end; in science it is the only end. WHEWELL.

Our Plates. Some particulars of "Porters," Shenley, Herts, were given in our issue for last week, when illustrations of the house and the lodge were published. The stables are built of local red bricks with Portland stone dressings, the roof being covered with hand-made tiles.—The design by Mr. A. R. Jemmett for proposed town hall, public buildings and municipal offices for Durban, Natal, was submitted in competition. The general idea has been to treat the three buildings as one complete scheme in which each building has its proper relative importance, and to lay out this scheme on broad simple structural lines. The elevations have been treated quietly and simply, reliance being placed on broad masses and strong lines to obtain a good effect. The scheme generally is presented as an idea capable of further elaboration and study for the general treatment of the programme. The attempt was to produce a building that would be practical, economical and reasonable, while being at the same time sufficiently architectural and monumental in conception and treatment. Three distinct buildings capable of easy intercommunication were suggested. This arrangement has been adopted as a guiding principle, modified only as the necessities of the case demanded. The town hall thus becomes an isolated block with a blank wall facing the other buildings, connected only by open screens of masonry, while the offices and public buildings are isolated on the basement and ground floors but joined together on the two upper floors, thus leaving two open carriage-drives into the internal court. This arrangement secures a free current of air through all courts from which the offices or other rooms are lighted, and in the case of fire provides a passage way for the engines and facilities for attacking the fire from every point. As a provision against the spread of fire, these two blocks are separated on the upper floors by a party-wall and double iron doors above, and the cross walls of the central projecting pavilion are taken up to divide the roofs. The main approach and entrance to the town hall form the principal façade, as was desired. The projecting wings of the covered portico enclose a carriage-drive up to the central entrance and covered porch. Foot-passengers approach through this portico and use the doors on each side of the central one, thus leaving this free for carriages setting down. The robing- and retiring-rooms, right and left of the entrance, are so arranged that people all leaving together can enter by one door and leave by the other without retracing their steps. The supper- and lecture-rooms are placed above the entrances with a stair at each end, so as to obtain the advantage of arranging them *en suite*, suitable for the reception and circulation of a large company. For this purpose also a gallery is shown behind the orchestra, by means of which the whole of the museum and art galleries could on special occasions be connected with these rooms, with the hall, and the open-air promenade over the portico. The arrangement of the town hall as regards exits, staircases and seating has been based on the regulations of the London County Council. The hall will seat on the ground floor 2,010, on the lower gallery 490, and on the upper gallery 646, giving a total of 3,146. The council-chamber is on the first floor, above the town treasurer's general office, and extends to the second floor so as to give good height.

Rotherham Infectious Diseases Hospital.

The foundation-stone of the new infectious diseases hospital for the county borough of Rotherham was laid recently. The site is on the north-west side of Badsley Moor Lane, a little over a mile from the parish church, and has an area of $8\frac{1}{2}$ acres. The hospital buildings are arranged on the pavilion plan and face south-east. There are five ward blocks, each with equal accommodation for males and females, namely:—Acute scarlet fever, 18 beds; male scarlet fever, 16 beds; typhoid, 14 beds; diphtheria, 14 beds; observation block, 4 beds; total, 66 beds. Included in the above accommodation are six private wards of one bed each. Attached to each block are the nurses' room, bathroom, stores and linen places, w.c.'s and slop sinks. All the wards will be heated by central stoves with double fires. Careful arrangements have been made for ventilation. The floors will be of pitch-pine, polished. Verandas will be provided at the front of each ward. The buildings will be of local bricks and Matlock stone dressings, relieved with white Lincolnshire brick bands and moulded string-courses. The interior of all w.c.'s, sinks, bathrooms and lavatories, also the disinfecting-rooms, mortuary and a portion of the laundry block, will be lined with white glazed bricks. The contract for the hospital (but not including the mild scarlet-fever block) has been let to Messrs. William Thornton & Sons, of Rotherham, for the sum of £11,994, the work to be completed in fourteen months. The total cost of the whole scheme, including mild scarlet-fever block, steam-laundry fittings,

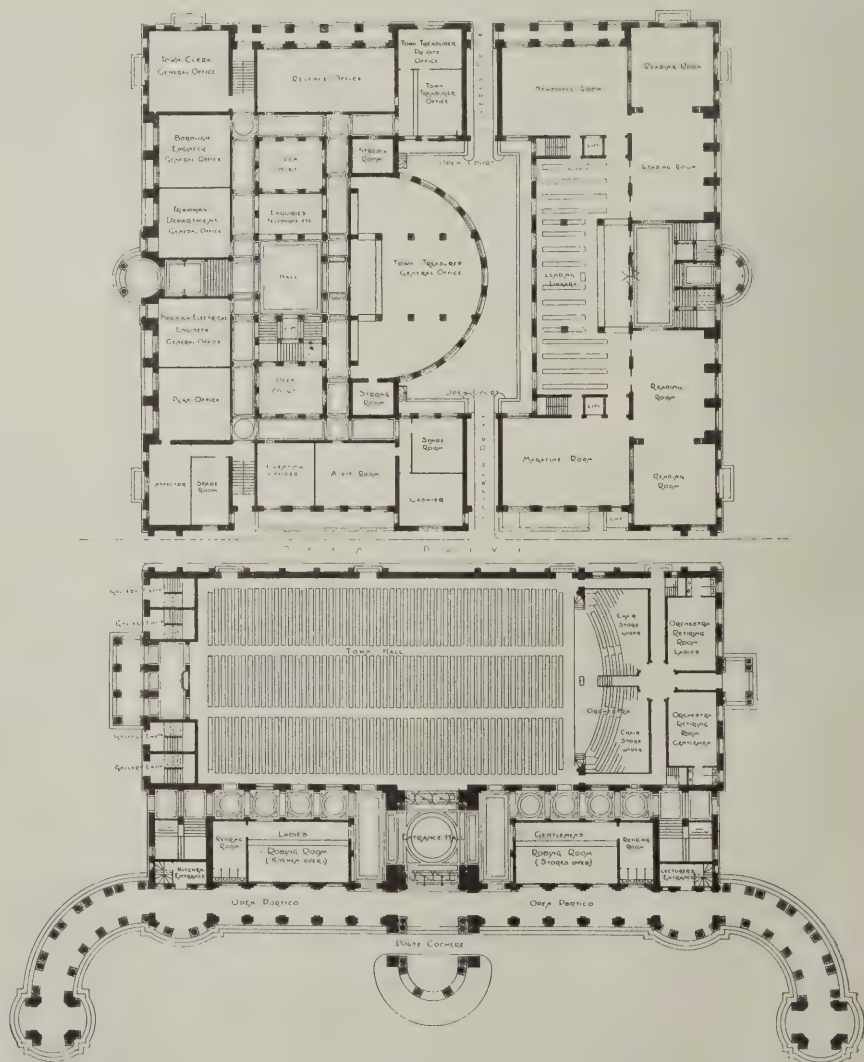
electric-light installation and laying-out of grounds, will be about £20,000. The county borough's service of water will be laid on to all the blocks. Mr. J. Platts is the architect.

Obituary.

Mr. Albert Hillier, who for many years was general manager for Messrs. McWilliam & Son, builders and contractors, Bournemouth, died recently at the age of 64 years.

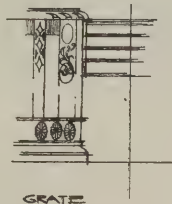
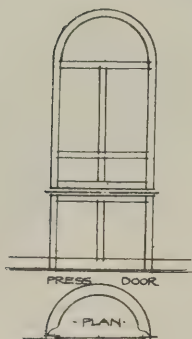
Mr. W. E. Mitchell, of the firm of Messrs. W. H. Mitchell, Son & Gutteridge, architects, Southampton, died recently at the age of forty-four years.

Mr. Frank M. Kent.—From a Natal paper we learn of the death of Mr. Frank M. Kent, of the firm of Kent & Price, architects, of Natal, who was brutally shot by his kitchen boy. Deceased, who was about thirty-two years of age and unmarried, was a native of Sheffield. Going to Natal in 1897, he entered the services of the Public Works Department as a draughtsman. At the end of the year he left the services of the Department, having had designs accepted for the Girls' High School, Durban, and entered into partnership with Mr. Price, with whom he made rapid strides in his profession. After a severe illness he came home to England on a visit last year, and had only recently returned to Maritzburg. His partner, Mr. Price, is at present on a tour in India, and the tragedy took place at the latter's house, which was being occupied by Mr. Kent during Mr. Price's absence.

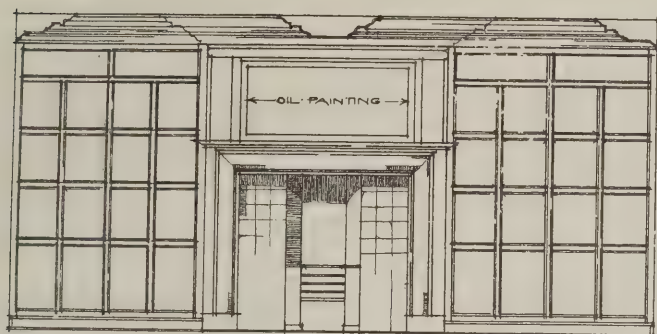


DURBAN TOWN HALL AND MUNICIPAL BUILDINGS: GROUND-FLOOR PLAN.
A. R. JEMMETT, ARCHITECT.

BLACK
SWAN
• INN
• YORK •
TWO SIDES OF •
PARLOUR AND •
DETAILS



SKETCH • •
FROM STREET

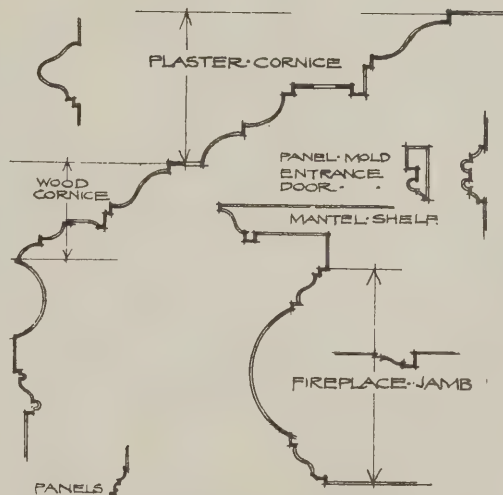


ELEVATION •
TO FIREPLACE



PLAN • OF •
MARBLE •
HEARTH •

PANEL •
MOLD



DOOR • PANEL

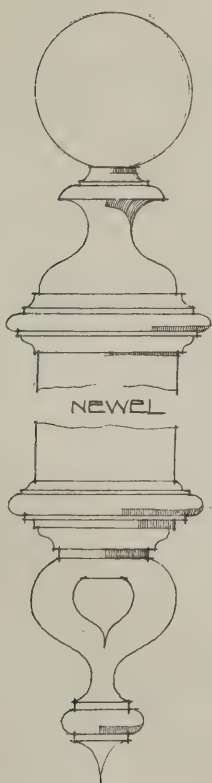
STILE



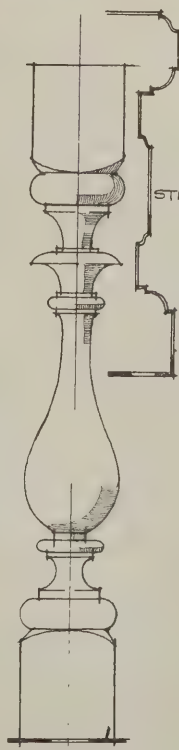
SAMPLE • OF • TILES



PANEL • IN • CEILING



NEWEL

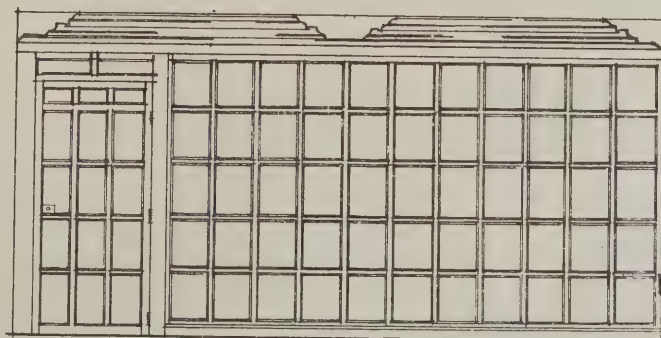


BALUSTER

STRINGER

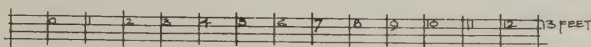


HAND
RAIL



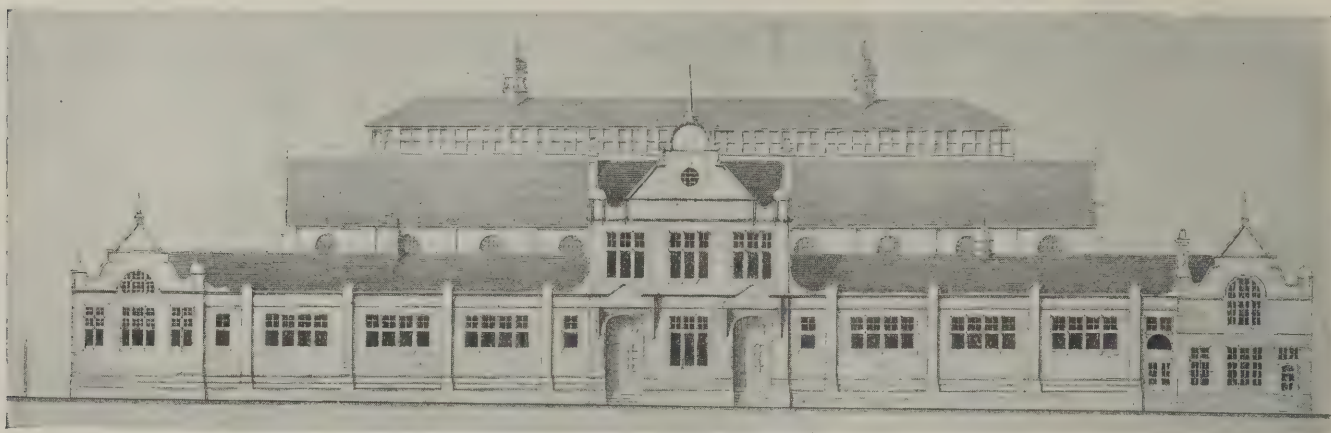
ELEVATION •
TO • DOOR •

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NOV. 01.



MEASURED AND DRAWN BY W. S. A. GORDON.

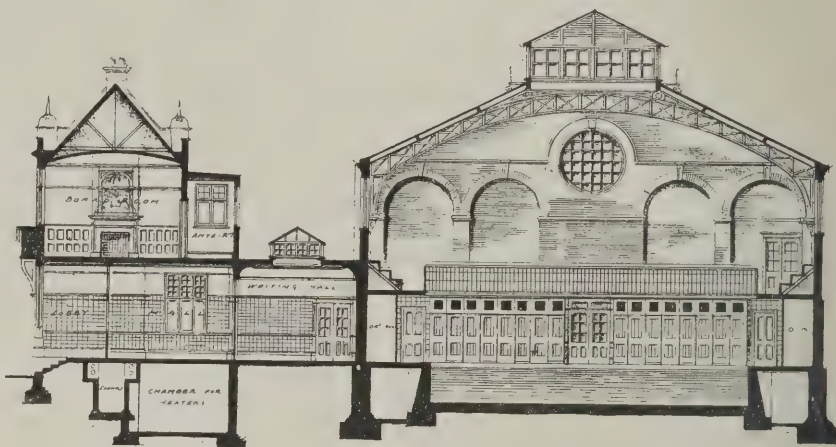
This house, which is situated in Peasholme Green, was at one time the residence of William Bones, mayor of the city in 1417. The interior is now much cut up by partitions, dividing what was once a large entrance hall into smaller rooms. The main staircase was at the end of this hall, opposite the doorway, and is still in good condition. The room illustrated is at present used as a smoking-room and is on the ground floor. The tiles and plasterwork shown are from the room over, which is panelled in a somewhat similar manner. The exterior is rough-cast, with a brick base and some good carving in the barge-boards.



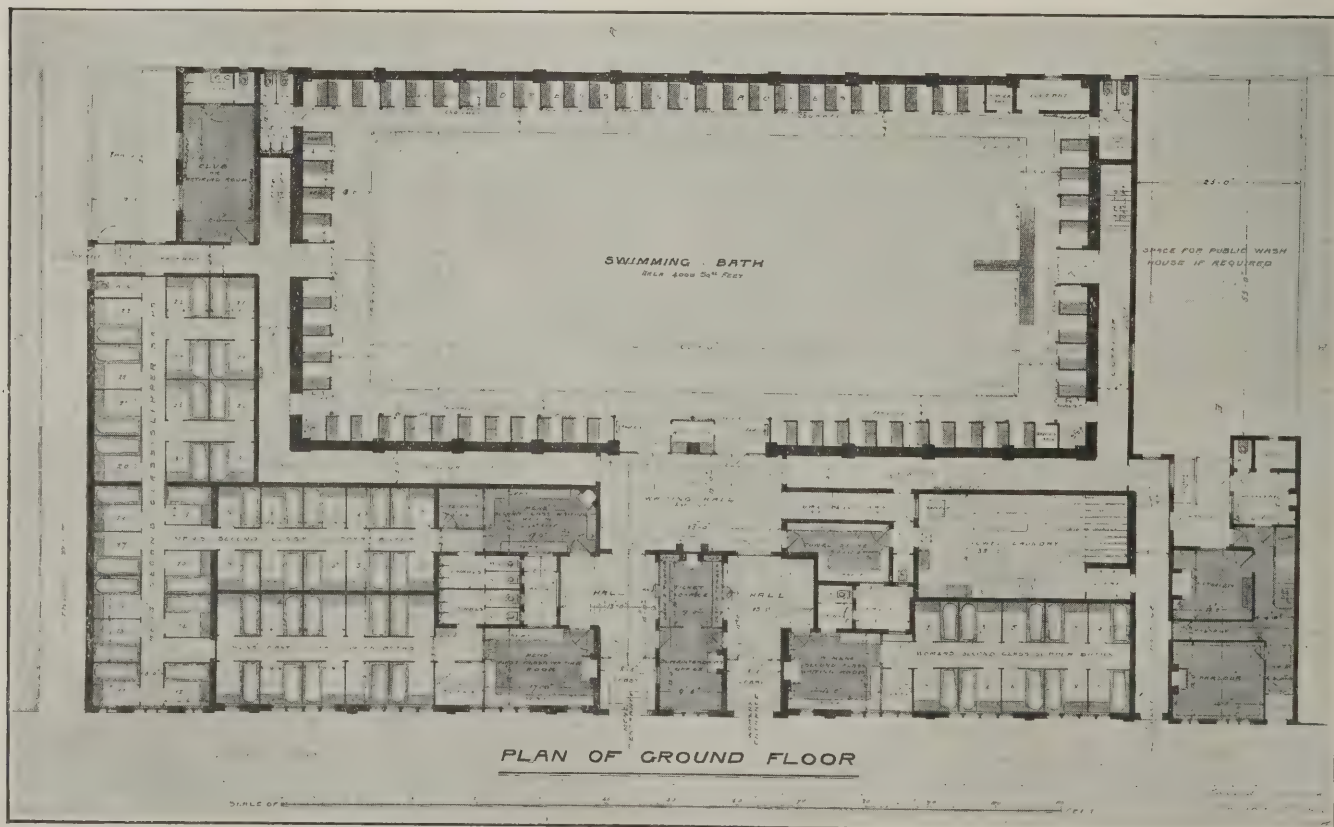
FRONT ELEVATION.

PUBLIC BATHS, NEW BROMPTON.

THE design for public baths at New Brompton, Kent, illustrated on this page was recently selected in open competition, and the building is about to be erected. It will be situated in Windsor Road, adjoining the electricity generating works, from which it will obtain its steam supply for all purposes. The swimming hall is so arranged that it can be used for assembly purposes when desired, the whole of the dressing-boxes (which number over sixty) being removable, and sufficient exits provided. To the left of the main entrance are the men's first- and second-class slipper baths, the women's baths being on the opposite side, together with the towel laundry and space for a public washhouse if required. All floors and flats are to be of ferro-concrete. The front elevation will be carried out in red bricks and terra-cotta, with slates on the roofs. Messrs. Fermaud & Dickinson, of 5, John Street, Adelphi, are the joint architects.



SECTION ON LINE A-A.



PLAN OF GROUND FLOOR

Law Cases.

Light and Air Case: Important Judgment.

—The light and air case of *Kine v. Jolly* recently came before the Chancery Division of the High Court of Justice. The action was originally tried before Mr. Justice Kekewich in December, 1903, when his Lordship granted a mandatory injunction as to so much of the defendant's building as interfered with the ancient lights mentioned in the statement of claim, but the operation of the injunction was stayed pending an appeal to the Court of Appeal. Before the appeal came on for hearing the judgment of the House of Lords in *Colls v. Home and Colonial Stores* had been delivered, and in these circumstances the Court of Appeal remitted the case to the judge for retrial. The plaintiff was a widow lady residing with her family at a house in Acacia Road, Acton, known as "Woodthorpe." She complained that the defendant had recently built a house which materially obstructed the access of light to the windows of the drawing-room and the morning room on the ground floor and to the hall of the house. It was admitted that the lights were ancient. The defence was that the damage was not substantial.—Mr. Justice Kekewich, in delivering judgment last week, said: The first question is whether the plaintiff has a cause of action. This has to be considered on the lines of the recent decision in *Colls v. Home and Colonial Stores, Ltd.*, which lays down a rule admittedly difficult of application but in itself profoundly simple. The Lord Chancellor says, "The question is in each case whether it" (that is, obstruction of light) "amounts to a nuisance which will give a right of action," and Lord Lindley says "the question to be decided is not how much light is left but whether the plaintiff has been deprived of so much as to constitute an actionable nuisance." That in this case there has been an obstruction of light which can be seen and felt (I purposely avoid such words as considerable and material) is clear beyond dispute and was not contested. Is it such as to constitute a nuisance? At the first trial I was convinced that there had been an interference with the enjoyment of the drawing-room, and that, though it still remained a well-lighted room, it had been deprived at certain seasons and for certain times of the direct sunlight, which, however we may treat it, must be regarded as a treasure by all. I see no reason to alter that opinion, but testing the result by the House of Lords' rule, and taking as my guide Lord Lindley's expression of it, which is perhaps the most favourable to the plaintiff, I cannot deem the obstruction to be actionable. It is such an obstruction as she might, having regard to all the surrounding circumstances, have reasonably anticipated as almost a necessary accident, and, notwithstanding the obstruction, she has still a well-lighted apartment apt for its appointed purpose—use as a drawing-room—and practically as useful and enjoyable as of old. Taking this room alone, the plaintiff has no cause of action. At the second trial there was mooted a new question which must now be considered, namely, whether there is an actionable obstruction of light coming to what is called the hall—a porch with glazed doors leading into the house and a fanlight over. The evidence is clear that this part of the house did enjoy a large measure of light, and that a considerable portion has been obstructed. There is also evidence that it was occasionally used as a sitting-room, and I conclude that the occasional use was just when the obstruction will now render the spot less cheerful. But taken alone I cannot regard the interference as a nuisance within the meaning of the judgment in the House of Lords. The great

cause of complaint has been of the obstruction of light to the morning-room. It was an exceptionally well-lighted room, and even now is well lighted, so that if the test were whether there is sufficient light left to enable the room to be used for the purposes for which it was designed, there would be no further question. But as I understand the judgments in the House of Lords, that is not the test, though it is a matter for consideration. That there has been a large obstruction of light by the erection of the defendant's house is abundantly clear, and I think it also clear that there has been a large interference with the cheerfulness of the room. I am convinced that the character of the room is altered, and that, though still a well-lighted room, it has lost in the obstruction of light one of its chief charms and advantages. In determining whether this is a nuisance or not I must take into consideration all the surrounding circumstances, not forgetting that the plaintiff purchased a house with the knowledge which must be imputed to her—that it was one of a projected row of houses, and that sooner or later there was sure to be erected on the adjoining plot then vacant another house which was not unlikely to be of a size and character similar to her own. Having given all these circumstances full consideration, I have come to the conclusion that the obstruction of light to the morning-room is a nuisance within the meaning of the authorities on that subject. The plaintiff having a cause of action and being entitled to relief, the next question concerns the form which that relief should take. She insists that damages are not an adequate remedy, and I concur; but is she entitled to an injunction which, if granted at all, must be mandatory? I do not propose to say with precision what the damages, if damages were the proper remedy, ought to be, but they could scarcely be less than £300 to £400, and such a sum is not merely substantial, but, when given by reason of the injury to one of the most useful rooms in the house, is a cogent argument against the adequacy of any damage at all. There is, in my judgment, no other reason why the Court should not, to use Lord Macnaghten's language, incline to damages rather than to an injunction. The defendant knew that there were ancient lights to be respected, and his architect intended to respect them, according, of course, to his own opinion touching the extent of respect required. He did not intentionally transgress the line laid down by himself for himself, and he adheres to the opinion that he has done nothing which the law will not allow. On the other hand, there is no attempt at extortion, nor has there been delay in commencing proceedings. The plaintiff knew that the defendant did not intend to injure her, and properly waited until the real facts could be ascertained. In these circumstances it appears to be my duty to grant a mandatory injunction, and the question occurs what shall be its form and extent? Take the extent first. It is argued on behalf of the plaintiff that I must regard the nuisance to the house as a whole. But there might not be a nuisance as regards any particular part of a house and yet the aggregate injury to different parts might constitute a nuisance to the whole, or, in other words, that as the whole is the sum of the parts so the whole injury is a combination of the detailed injuries. This is a novel point. It could not well have arisen of late years, while the obstruction of light was regarded as an interference with property and the access of light to each window had to be considered separately, and the interference in one instance neither increased nor diminished the value of interference in others. But now that the rule is that the plaintiff must succeed or fail according as he establishes a nuisance or not, the situation is altered, and

the proper question for a judge or a jury is no longer has the access of light to this or that window been so obstructed as to create a nuisance, but has the defendant so obstructed the access of light to the plaintiff's house as to create a nuisance? In this aspect of the case the interference with the dressing-room comes into consideration, but on the evidence before me now I am convinced that the interference with that room may safely be treated as negligible. It is otherwise as regards the hall. Taking that alone, I should not hold a nuisance established, and, even if it were, I should certainly consider the case one for damages; but the interference with the hall cannot be treated as a negligible quantity, especially as, according to the evidence, it certainly enters into the diminution of value of the house. I must treat the nuisance as created by the obstruction of the light to the morning-room plus that to the hall, and make the injunction extend to both. As regards the form, Lord Macnaghten's remarks give a guide which it ought not to be difficult to follow. I propose to order the defendant to pull down so much of his house as causes a nuisance to the plaintiff by the obstruction of light to the windows of the morning-room and to the hall, as the same existed previously to the erection of that house. The defendant must pay the costs of this second trial. Having discharged that duty, I deem myself at liberty to offer a word of advice—immediately to the plaintiff, but also to the defendant. Damages are not, in my opinion, an adequate remedy, but they are a partial remedy, and the plaintiff would be well advised in accepting—what the defendant would be well advised to offer—a substantial sum to settle all disputes and put an end, once for all, to litigation and costs.

A Successful Claim for Fees.—The cases of *Hussell & Taylor v. Ainscough* and *Matear v. Ainscough* were tried together at the recent Liverpool Assizes. The plaintiffs in the first are quantity surveyors, and the plaintiff in the second, Mr. H. A. Matear, is an architect practising in Liverpool. Both claims were for professional fees and costs on account of work done. Counsel for the plaintiffs stated that Mr. Ainscough, who is a miller at Burscough, decided in 1902 to build at that place a residence to cost, including furniture, about £10,000. He consulted Messrs. Waring & Gillow, through whom the preparation of the plans was entrusted to Mr. Matear. Some difficulty, however, arose as to the cost. Defendant's counsel said Mr. Matear was told to prepare plans for a house to cost £5,000, but that, it was now suggested, was an afterthought, because from the correspondence and interviews the idea formed of the cost of the building was roughly £8,000. To get a close idea of the cost Messrs. Hussell & Taylor were engaged to take out the quantities. Afterwards Messrs. Waring, as contractors, sent in on the basis of the quantities an estimate for building amounting to £7,114. However, Mr. Ainscough, in a subsequent interview with the building manager of the contractors, said that as he had lost money on the corn market he would like the plans modified so as to reduce the cost of the house to £5,000. Accordingly the estimate was cut down to £5,500. In June Mr. Ainscough intimated that he had decided not to build, and the business having gone off, the architect and quantity surveyors brought these actions to recover their fees, which were in each instance 2½ per cent. on the first estimate of cost. The defendant declined to pay on the ground that as the matter had fallen through he was not liable for percentage charges. Mr. Matear, in his evidence, said 2½ per cent. was the usual charge for drawing the plans of a building of this class. Eventually the parties agreed to accept

judgment for Mr. Matear for £105 and costs and for Messrs. Hussell & Taylor for £100 and costs.

Building blown in by Gale: Damages for Negligent Construction.—At the Leeds Assizes last week, before Mr. Justice Grantham and a special jury, judgment was given in the case of *Bennett v. The Middlesbrough Co-operative Society, Ltd.*, the hearing of which lasted four days. The case arose out of the great gale which swept over the north of England on February 27th, 1903. The defendants' premises, adjoining the plaintiff's, were erected during 1901 according to plans and specifications supplied by Mr. W. G. Roberts, of Middlesbrough, which plans had been submitted to the Eston Urban District Council and approved by them. The building was three storeys high, with showrooms on the ground floor, warehouses on the first floor, and on the top floor a large public hall which was used for public entertainments and meetings. On February 27th, 1903, about half-past eight in the morning, the wind at the time blowing at the rate of seventy-five miles an hour or thereabouts, the roof of the defendants' premises was observed to be moving, and it was shortly afterwards noticed that the external wall, facing towards Normandy Street, South Bank, was sloping inwards and swaying in the gale. A quarter of an hour later the roof collapsed. Almost immediately afterwards smoke was observed to be rising from the wreckage, and very shortly the whole remnant of the building was in flames. At 9.30 or 9.45 there was a further fall of masonry, and large blocks of stone and brick were precipitated into the plaintiff's premises, which were soon covered with wreckage. Upon the above facts the plaintiff claimed £1,060 damages, the ground of his claim being that the defendants' building was negligently constructed and unable to withstand the stress of weather. Several architects, including Mr. Alexander Stenning, gave evidence to the effect (1) that the designs and construction of the defendants' block of premises were absurdly slight having regard to the character of the building; (2) that the workmanship was negligent and deficient, and (3) that the construction was not in accordance with the by-laws of the Eston Urban District Council. The defendants, on the other hand, alleged that their premises were not faulty in construction or workmanship, and also that the fall of the roof was due, not to defects in workmanship, nor to the gale, but to the fire. They also pleaded, alternatively, that the accident was due to the act of God. There was a direct conflict of evidence as to the time at which the fire began. Immediately after the fall of the premises both the plaintiff and the defendants had made claims from their respective fire insurance offices. The defendants' claim was allowed in full, but the plaintiff's claim was disallowed on the ground that the fire did not take place on his premises but on neighbouring premises.—The jury found for the plaintiff and assessed the damages at £925. Judgment accordingly with costs.

Another Workmen's Compensation Case.—In the Court of Appeal on Saturday the case of *Pattison v. White & Co., Ltd.*, was heard. This was an appeal by the employers from an award of compensation under the Workmen's Compensation Act, 1897, by Judge Templer, sitting at the Darlington County Court. The appellants, Messrs. White & Co., were engaged under a contract with the Corporation of Darlington in the construction of a system of light railways at Darlington, for which they required good sand. They selected a sandpit about $3\frac{1}{2}$ to 4 miles from the place where they were laying the permanent-way, and they contracted with one Wilkinson that he should cart the sand. A man named Pattison was employed as a carman by Wilkinson, and

while he was engaged in driving a cart with sand from the pit to the works he fell from it and the wheel passed over him and he was killed. The accident happened about $2\frac{1}{2}$ miles from the works. Pattison's widow claimed compensation, contending that the accident happened "on or in or about" the engineering work within section 7 of the Act. Messrs. White denied this. The county-court judge awarded the widow £187 4s., saying that it seemed to him to be clear that the deceased at the time of the accident was employed in fetching sand necessary to his employers for the construction of the engineering work which they had in hand. Supposing that the accident had happened after he had brought the sand within the precincts of the works, there would clearly be no defence; then why should the application fail simply because the deceased had not completed the journey he was upon?—The Court on Friday allowed the appeal. The Master of the Rolls said the county-court judge took a very wide view of the Act, and considered himself emancipated from the decisions of the Court of Appeal. In each limb of the definition of engineering work, physical locality was pointed out as that on or in or about which the employment must be at the time of the accident. That was laid down in a series of decisions in the Court of Appeal, and it was not competent for the county-court judge to emancipate himself from those decisions.—Lord Justice Stirling was of the same opinion, as also Lord Justice Mathew, who expressed the opinion that "on or in or about engineering work" denoted locality, and that here the accident did not happen where the engineering work was being carried on.

Keystones.

Three Painted Panels have been inserted in the front of the altar in St. Faith's Chapel, Westminster Abbey.

The Railings in front of Buckingham Palace are to be replaced by others of more ornamental design. The four gates are being removed, and their place will be taken by two replicas of the massive gates that formerly spanned what was known as "The Secretary's Gateway." The shape of the forecourt will be much altered.

Vauxhall Bridge: Date of Completion.—Mr. Akers-Douglas stated recently in the House of Commons that the time specified in the contract for the completion of the superstructure of the new Vauxhall Bridge was December 31st, 1905, with a provision of heavy penalties against the contractors in the event of delay beyond that date.

The Artillery Monument.—The Westminster City Council have sanctioned the erection in Waterloo Place, between the United Service and Athenæum Clubs, of a monument by the Royal Regiment of Artillery to their comrades who fell in the South African War. It is to be as large, or perhaps larger, than the Guards' memorial, to which it will stand opposite, and is to consist of a massive stone base, surmounted by a group in bronze representing a gun carriage, a gun, two horses and a gunner.

Mr. John James Burnet, A.R.S.A., the well-known Glasgow architect, has been instructed by Lord Windsor, First Commissioner of Works, to prepare plans for the addition about to be made to the British Museum. Some little time ago Lord Windsor requested the president of the R.I.B.A. to select six architects to one of whom the preparation of the plans might be entrusted. Mr. Burnet was included among these six, and after considering the specimens of work submitted Lord Windsor's choice has fallen upon him.

The possibility of extending the National Portrait Gallery on the west is being considered by the Departments concerned.

On Sir John Herschel's House, No. 56, Devonshire Street, Portland Place, a memorial tablet has been placed by the London County Council.

The Judgment in "*Colls v. Home and Colonial Stores*," from the official shorthand notes, has been issued in pamphlet form by the Society of Architects (Staple Inn Buildings, Holborn), price 2s. 6d.

Hitchin Infectious Diseases Hospital Competition.—Of the six architects selected to compete, Mr. H. Percy Adams, F.R.I.B.A., has been placed first by the assessor, Mr. Keith D. Young, whose award the committee have adopted.

Building Lock-out in New York.—Owing to the disagreements between the masters and employees, the Building Trades Employers' Association have shut their doors upon 17,300 men belonging to several different unions of builders' workers.

"Specification No. 7" is completely out of print, and we must ask those readers who have recently ordered copies to accept our apologies for the delay in delivery. A second edition is now in the press and we hope very soon to have copies ready for delivery.

"Builders' Journals" Wanted.—Copies of the following issues (which are out of print) are required by one of our subscribers:—1902: June 11th, August 13th and 20th, September 10th, November 12th and December 31st. 1903: February 18th and December 16th.

Coutts's New Banking Premises in the Strand were opened last week. Mr. J. Macvicar Anderson is the architect. A large amount of mosaic paving has been laid by Messrs. B. Ward & Co., who have also laid the wood-block floors with their Charteris & Longley's patent pattern self-keyed flooring. The gates and other ironwork are by Mr. W. Shrivell, of Castle Street, W.C.

Bath Abbey struck by Lightning.—During a thunderstorm last week the south-east pinnacle of the tower of Bath Abbey was struck by lightning. The top portion fell down and the stonework was otherwise damaged. The tower of St. Mary's Church, Brecon, was also struck, the current passing down the lightning conductor and tearing up the pitching of the roadway below.

The new Annexe to Victoria Station, described on p. 47 of our issue for July 27th, has been designed under the supervision of Mr. Charles L. Morgan, M.I.C.E., the company's engineer, who has been assisted in the architectural work by Mr. C. D. Collins, M.S.A., the chief of his architectural staff. The contractors for the general station work are Messrs. J. Mowlem & Co., Ltd., the steelwork being supplied and fixed by Messrs. A. Handyside & Co., Ltd., and Messrs. Head, Wrightson & Co., Ltd.

Manchester Society of Architects.—Some members of this society had a most enjoyable three days' visit to Oxford last week. Arriving on Friday night, the whole of Saturday was spent in visiting the town hall and six of the colleges. On Sunday Mr. Bodley's new church for the Cowley Fathers was inspected, the internal effect making a profound impression on the visitors. In the afternoon the party went to Iffley, where some hasty jottings were made of the famous Norman church and of the very delightful old rectory. On Monday the charms of sketching at St. John's or Magdalen weighed more heavily with most of the party than mere sightseeing, it being recognized as impossible to see nearly all the beauties of Oxford during so short a visit.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Buildings to Measure around Peterborough.

MANCHESTER.—J. B. writes: "Are there any buildings on the north side of Peterborough worth sketching or measuring for the R.I.B.A., intermediate examination, other than the cathedral?"

The district around Peterborough is an architecturally rich one, especially along the Nene Valley, but detailed information would be best obtained locally, though there is known to be a Norman church at Peakirk. Why, however, go beyond the cathedral? It contains ample material for all the necessary measured drawings, if a sketching permit be obtained.

G. A. T. M.

Buildings to Measure around Mold.

LIVERPOOL.—R. R. writes: "Are there any buildings within cycling distance of Mold suitable to measure for the R.I.B.A. intermediate examination? I intend spending two or three weeks there."

There is plenty of material for a fortnight's sketching to be found at Chester and at the abbey of Valle Crucis at Llangollen. At Chester, in the cathedral, the old groining in the passage out of the cloisters is a very good specimen of an Early English roof. There is also a good Early English staircase in the refectory (now a grammar school) leading up to a large niche, a sort of pulpit for the reader. The distinction between the Early English small multiplied mouldings and the bold Decorated ones may be well observed at Chester, where the arch between the choir and the Lady Chapel is of very fine Early English work, and the arches of the nave are very good Decorated work; these two also show the difference of character of the two descriptions of piers. There is also some very good work accessible for sketching on the west front, which is Perpendicular. For Valle Crucis, refer to p. 44 of *THE BUILDERS' JOURNAL* for July 27th last.

G. A. T. M.

Articles on Building Construction.

LONDON.—W. S. P. writes: "In which issues did your series of building construction articles appear?"

Two series of articles on building construction have been published in our columns. The first, comprising fifteen articles, appeared in the following issues:—1901: September 25th, October 2nd, 23rd, 30th, November 6th, 13th, 20th, December 4th, 11th, 18th, 25th, and 1902: January 8th, 22nd, February 12th and 26th. The second series, comprising nine articles, appeared in the following issues:—1902: November 12th, 26th, December 3rd, 17th, 31st, and 1903: January 14th, February 4th, 18th, May 6th.

Acceptance of Lowest Tender.

WREXHAM.—SUBSCRIBER writes: "A Board of Guardians recently invited local architects to apply for the preparation of plans, &c., for the proposed alterations to buildings, and the erection of sick wards, stating terms. The 'applications' or tenders were considered by the Visiting Committee, but none of them were accepted or submitted for the approval of the Board. It now transpires that they did not wish to give the work to the lowest tender, and have decided to invite fresh 'applications' from architects in general. Can they legally do this, seeing that the advertisement did not contain the usual clause, that the lowest or any tender



THE BUILDING OF HOYLE'S WAREHOUSE, MANCHESTER. CHARLES HEATHCOTE AND SONS, ARCHITECTS.

This photograph was taken on August 3rd, practically a month later than that reproduced in our issue for July 13th. By comparing the two it will be seen that the building is now two storeys higher.

would not necessarily be accepted? And has the lowest tenderer any remedy?"

The local architect whose price was lowest appears to have been treated very cavalierly by the Board of Guardians, but I can find no decided case which clearly points to a legal claim on his part being enforceable. The matter resolves itself into the question "Can he prove the existence of a contract?" and this question I would advise him to submit to his solicitor, giving him a copy of the "invitation to tender" and all other documents in the case. The essential part of any contract is "unconditional offer and its unconditional acceptance," but in the case of a public body it is usually necessary to prove a contract under seal, and I very much doubt if in this case the aggrieved architect has any redress. Refer to "Specification No. 6," p. 137.

F. S. I.

Liverpool Cathedral.

LIVERPOOL.—R. R. writes: "In your issue for last week, dealing with the 'Telegraph's' criticism of Liverpool Cathedral, you referred to Messrs. Bodley & Shaw's remarks on the same. Where can I find these?"

The criticism of the Liverpool Cathedral designs by Mr. G. F. Bodley and Mr. Norman Shaw will be found on p. 201 of our issue for May 20th, 1903; and Mr. Shaw's expressed opinion about Westminster Cathedral on p. 171 of *THE ARCHITECTURAL REVIEW* for November, 1901, where he says: "And see what the result is! Beyond all doubt the finest church that has been built for centuries. Superb in its scale and character, and full of the most devouring interest, it is impossible to overrate the magnificence of this design. It is like a revelation after the feeble Gothic stuff on which we have been mainly fed for the last half-century."

The Eretheum.

The answer given to the enquiry on p. 42 of our issue for July 27th is of course in feet. A module is divided into thirty parts. The difference between the two dimensions given is 1ft. 5in. = $\frac{1}{2}$ diameter = module.

Distances between Columns of Parthenon: Drawing Volute.

LONDON, S.E. — CONSTANT SUBSCRIBER

writes: "(1) What is the distance (in modules) between the centre of the corner column and the centre of the next in the Parthenon at Athens? (2) What is the correct method for drawing, mechanically, the volute of the column of the north portico of the Eretheum?"

(1) At the north corner, east elevation, the distance is 12'019ft.; south corner, east elevation, 12'20ft.; west corner, north elevation, 12'149ft.; east corner, north elevation, 2'24ft.; east corner, south elevation, 12'179ft.; west corner, south elevation, 12'142ft.; south corner, west elevation, 12'195ft.; and north corner, west elevation, 12'118ft. These have been taken from Mr. Penrose's measurements, and it will be noticed that the dimensions are in feet and decimals. A module is 6'019ft. on the north-east angle column. (2) There is no correct mechanical method of drawing the Ionic volute. All suggested methods, however nearly they approximate to the truth, are in reality guesses at the method adopted by the Greeks, which nobody can declare with certainty to have been discovered yet.

G. A. T. M.

Charges for Work Done.

LONDON, W.C.—A. M. H. writes: "What would be a fair charge to make for a set of plans and tracings for alterations to business premises in London, submitting them to the L.C.C. for permission for bay windows up the front of building, and supplying block plan, &c., to district surveyor, also supplying plans and specification to ground landlord, and preparing approximate estimate for the work amounting to £1,600? This estimate being more than my client wished to spend, he further instructed me to modify same, which necessitated re-writing the specification and making alterations to plans, leaving out the work to the ground floor and providing the sum of £300 for new front and fittings to shop and basement. I supplied five copies of the specification and an approximate estimate which amounted to £500, including the £300 for shop to be expended by the tenant. My client after waiting several months called in a builder without consulting me, and had all the work done as shown in my modified plans and specification. What is a fair charge for me to make? I

may add that I have been offered £5 in settlement, which I have refused."

A schedule of the "Professional Practice as to the Charges of Architects" was issued by the R.I.B.A. in 1872 and revised in 1898. Though, of course, not legally binding, the fact that it emanates from such an authority gives it very considerable weight. A copy may be obtained at the Institute, price 6d. (address, 9, Conduit Street, Hanover Square, W.). Under this schedule your charges would be as follows:—(a) All out-of-pocket expenses; (b) 3 per cent. on £500 (the finally approved plan); (c) a fee for first drawings not adopted (if in accordance with client's instructions); (d) a fee for drawings and negotiations with L.C.C.; (e) a fee for drawings and negotiations with ground landlord. Charge (c) is often waived, and the amounts of charges (d) and (e) depend upon the circumstances of the case and the amount of time and labour involved. Refer to "Specification No. 6," p. 12.

F. S. I.

firegrate, but it is the costliest in fuel and the most troublesome to look after. The cheapest method in fuel, and that which gives the most even warmth over all the room, is by hot-water pipes, or by radiators if the connecting pipes are to be out of sight. The first cost may be the same as with fires if no firegrates be fitted and the recesses made with glazed bricks or lined with tiles. The allowance of heating surface must be spare, or the room will be stuffy. Gas stoves are the most convenient and the cleanest, and if properly made are healthy. Those with a chimney-pipe large enough to draw plenty of air from the room as well as all the fumes up the chimney are healthier than hot-water pipes, as positive ventilation is ensured. The crude makeshift of an iron sham-egg basket to go into a register firegrate will not be satisfactory. Stoves made to suit fireplace recesses are on view in most gas-office showrooms, whether company or municipal. A good stove has, in addition to radiating

cistern and basin rather than try to moderate the sound by deadening the walls.

OSWALD WHEELER.

Profession to take up.

STOCKTON-ON-TEES.—R. B. writes: "In my career I have served four years in an architect's and surveyor's office, and can trace, ink in, &c. At present I am a draughtsman and clerk of works for a speculative builder on an estate here. My age is twenty. What profession should I take up? At present I am deeply interested in going in for either building or a sanitary inspectorship."

Having served a period of four years in an architect's and surveyor's office, and being at present in the position of a clerk of works, we should advise you to follow in that course rather than leave it for sanitary work, which is quite a new field to you. But everything depends on your circumstances, which you know best. You must be guided by that knowledge.

ARCHITECTURAL ASSOCIATION.

ARRANGEMENTS are being made by the Architectural Association for a week-end visit to Kettering and neighbourhood on Saturday, September 17th, returning on the following Monday morning.

The programme suggested is as follows:—*Saturday.* Visit Drayton House (Edward III., Henry VI., Elizabeth, William and Mary, eighteenth-century gardens, fine iron gates), also Barton Seagrave (church), Cranford (two churches), Islip (church) and Lowick (church and monuments): returning *via* Slipton, Grafton, Warkton, Boughton House (good William and Mary house, with some fine furniture), Weekley (church and almshouse) *en route* to Kettering, where Mr. and Mrs. Gotch have invited the party to tea. *Sunday.* Visit Kirby by way of Geddington (Queen Eleanor's Cross), Stanion (good church spire) and Weldon (interesting small houses): returning by Rockingham (castle) and Great Oakley.

Mr. J. A. Gotch will accompany the party on Saturday. It will greatly assist in completing the arrangements if members proposing to join the party will forward their names to the secretary at 18, Tufton Street, Westminster, at an early date.

The following is the

List of Papers for Next Session.

1904.
Sept. 30—Annual General Meeting. President's Address and Distribution of Prizes. E. Guy Dawber, F.R.I.B.A.
Oct. 14—Photography as applied to Architecture. E. Dockree.
Nov. 11—Ventilation. W. Henman, F.R.I.B.A.
" 25—Excavations in Westminster. E. Prioleau Warren and J. T. Micklethwaite.
Dec. 9—Some Architectural Reflections. T. Raffles Davison.
1905.
Jan. 6—Libraries. Alfred Cox.
" 27—Byzantine Architecture. E. F. Reynolds and J. B. Fulton.
Feb. 10—Church Fittings.
" 24—Country Houses and Accessory Buildings. F. J. Osborne Smith, A.R.I.B.A.
March 10—Law Courts. H. V. Lanchester, A.R.I.B.A.
" 24—Sketch Plans and Working Drawings. A. Needham Wilson, A.R.I.B.A.
April 7—Subject to be announced. H. Phillips Fletcher, F.R.I.B.A.
- The above meetings will be held at 7.30 p.m. on the Fridays stated at 18, Tufton Street, Westminster.



THE CLOTH HALL MALINES. DRAWN BY J. H. BECKETT, A.R.I.B.A.

Building Directories.

BANBURY.—SANITAS writes: "Which are the best directories for a builder and contractor to advertise in, so as to come before architects, manufacturers, &c.?"

"Specification" (6, Great New Street, Fetter Lane, E.C.), "Kelly's Directory of the Building Trades" (182, High Holborn).

Heating Apparatus, Lavatory Basins, Deadening Sounds in House.

WEST HARTLEPOOL.—S. writes: "(a) Is it healthier and cheaper to heat small sitting-rooms and bedrooms by hot-water radiators, separate gas fires or the ordinary coal fire in grate? (b) Can a small hot-water installation with a slow combustion coal stove be bought that is really satisfactory in practice? (c) I want to put lavatory basins in each bedroom (instead of washstands) with water from the main laid on, and a waste outlet pipe, but am told the outlet pipe would be a source of trouble and bad health. Is this so, and what is the best remedy? (d) Which is the best way to prevent noise passing from one room to another through thin walls and for making a w.c. and bathroom more private? Is sawdust or any other material effective for filling hollow partitions with it?"

(a) The healthiest way to heat a small bedroom or dwelling-room is by a warm-air

material heated by the flame, sufficient of warm outside casing to heat the air of the room in the same way as an iron radiator does. If the hot-water radiator be made ventilating, by being placed at the outer wall at an air-grating with a shutter, a much sweeter warmth can be had so long as both grating and chimney are open, but the risk of damage by frost is rather great in private houses. (b) By "slow combustion coal stove" I conclude is meant an open slow-combustion firegrate, and not a square or round stove that encloses its fire. Dwelling-room firegrates with a boiler at their back have been made by various firms for some time, and the results justify their adoption. However, small independent boilers give as good results at about the same first cost and are more convenient to stoke. The firegrate boiler should be used for heating only and not for domestic supply of hot water. (c) The fitting of wash-basins with hot and cold water laid on is common practice in America. If the plumbing is properly done, the room ventilated efficiently, and the outlet flushed say once a week with hot soda water or disinfectant, there is no reason why any trouble or injury to health should be caused. (d) Slag wool is the best sound-deadener. Walls, floor and ceiling should be treated if the silencing is to be thorough. As to the w.c., it is better to get a syphonic closet or a quiet



GEORGIAN FIREGRATES MADE BY THE CARRON COMPANY.

Correspondence.

Underpinning Party-Walls.

To the Editor of THE BUILDERS' JOURNAL.

BIRMINGHAM.

SIR,—Referring to the short article and illustration on p. 51 of your issue for July 27th, I have used a somewhat similar method to that shown, except that instead of cutting chases in the wall to form a footing for the struts, I inserted a short needle through the wall projecting about 1ft. on either side, the struts resting on this, getting a stronger bearing with less labour and also giving the opportunity of inserting additional wedges if necessary underneath the struts.—Yours truly,

WILLIAM BIAIN.

Buildings to Measure around Llandudno.

To the Editor of THE BUILDERS' JOURNAL.

SHEFFIELD.

SIR,—I was pleased to find that one of your many readers supplemented the answer of "G. A. T. M." with reference to places to sketch in the neighbourhood of Llandudno. In addition to the buildings mentioned by "C. O. N.," may I suggest Conway Church, where there is a fine oak screen of late fifteenth-century work, together with some choir stalls of the same period; and the church also contains a font of pleasing design, probably dating from the early part of the same century. This font is identical, except in details of carving, with that in the church of St. Mary at Shrewsbury, or which was there previous to the fall of the spire, for I have not seen the interior of the church since that unfortunate accident took place. Plas Mawr is full of interest to the student, although some of the details are rather coarse; still the ceilings are worth study, and so is the woodwork and old furniture, of which the house contains a large amount. The flat relieving arches over the outside of the windows show how a difficulty arising from the small size of the available stone was overcome. Much if not all the ornamental plasterwork at Gwydir has been renewed, the models being obtained from the work at Plas Mawr, which was fitting, as both houses were originally associated with the Wynn family. The church at Llanrwst contains a fine oak screen, and the bridge over the river here is also worth inspecting.—Yours truly,

JAMES R. WIGFULL.

Trade and Craft.

Cast-iron Grates.

Exactly when and how they were perpetrated is an enigma, but we are unfortunately only too familiar with the atrocious designs for cast-iron grates that remain a legacy of the Victorian Era. Their chief characteristic is an abundance of meretricious ornament spluttered wholesale over every part, with ugly kinks and corners, and the split pediment introduced in every conceivable position: the ornament, too, is in that very high relief adopted at all degenerate periods. So much has this been the case that, till recent years, one had come to regard almost every cast-iron grate with rank distaste. Things, however, have changed vastly within the last two decades, which have witnessed an improvement in every branch of design. New models have been

followed, or, to be more correct, old ones have been readopted and developed. There has been especially a reversion to Georgian work. That this can be dull and monotonous has long been evident, but it also exhibits many pleasant features, as we may see especially in the old houses of the period that still abound. Taking some of the relics of that period, Mr. John Kinross, A.R.S.A., of Edinburgh, has arranged the designs for firegrates illustrated on this page, and there are doubtless scores of people who would much prefer them to the grates which the average landlord sees fit to put in our houses. The designs are made up from eighteenth-century work executed at the Carron Works from 1780 to 1800, by Messrs. Henry & William Haworth. They are just three from a large number illustrated in the pamphlet of the Carron Co., who have recently opened new London showrooms at 23, Princes Street, Cavendish Square, W.



ADAM FIREGRATE MADE BY THE CARRON COMPANY.

Builders' Notes.

Building Enterprise at Newcastle.—Messrs. Milburn, who have reared an immense pile on the Side at Newcastle, have decided to acquire the house property opposite, with a view to demolition and the subsequent erection of another large building.

Disappearance of a Bradford Builder.—Mr. Thomas Bradley, a builder and contractor, of Bradford, and a member of the Board of Guardians, disappeared about a fortnight ago, since when nothing has been heard of him. He is a married man about forty-two years of age.

The Building Trade in Denmark.—Denmark, which has of late years proved a valuable customer for assorted cargoes of small boards, of which she has yearly imported ever-increasing quantities, is now suffering from over-speculation in the building trade, says the "Timber Trades Journal." Speculation has been rife not only in Copenhagen but throughout the country.

Big Cement Order.—At a meeting of the Derwent Valley Water Board, at the Town Hall, Sheffield, authority was given for the purchase of various plant and materials required in the construction of the works, including 20,000 tons of Portland cement required in the building of the Howden and Derwent dams, and eighty additional railway wagons for the carriage of stone blocks and rubble from the Bole Hill Quarries at Grindleford.

Kensington Improvements.—The Kensington Borough Council has adopted the principle of allowing private subways to be constructed in the main streets of the borough. An important scheme for the further widening of Kensington High Street, part of the main thoroughfare from Piccadilly to the western district, has been sanctioned by the Kensington Borough Council. It is in connection with the development of the property on Sir Walter Phillimore's estate situate on the north side of the street between the public library and Holland Walk. The strip of

land to be added to the public way varies in width from 13ft. to 16ft. along a frontage of nearly 400yds. For this gift the owner seeks to be permitted to advance the building line approximately 9ft.

The new Poorhouse Hospitals, Falkirk, are being warmed and ventilated by means of Shorland's patent Manchester stoves with descending smoke flues, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

An Ingenious Channelling Machine.—Among recent additions to the Victoria and Albert Museum is the collection of quarrying machinery in the Science galleries (near the entrance). This includes the very ingenious channelling machine used on the rock excavations of the Chicago Drainage Canal. The channel cut by it is from 4ft. to 7ft. deep and 50ft. long, removing exactly what is required, and leaving a finished surface on the portion excavated.

The Transporter Bridge at Newport, Mon., described and illustrated in the supplement to THE BUILDERS' JOURNAL for January 10th, 1900, is now nearing completion. Its chief dimensions are as follows:—Height of open-lattice steelwork towers, 241ft.; span, centre to centre of towers, 645ft.; height from high-water mark to underside of stiffening girder, 177ft. The elevated traveller will be 104ft. in length, carried on sixty wheels arranged in pairs. The propelling power will be electricity. The car will be 33ft. in length by 40ft. in width, and capable of conveying a number of vehicles and 500 passengers. The trip will occupy about one minute. It is hoped that the bridge will be in operation nine months hence. One of the chief advantages of the "transporter" type of bridge is its comparative minimum cost. At Newport the cost of the "transporter," including a connecting bridge on one shore and electrical equipments, is estimated at £40,000, whereas the estimate for a suspension bridge was £2,000,000; a high level bridge, approached by spiral roadway, £1,250,000; a swing bridge, £700,000; and a bascule bridge, £150,000.

The famous Gowbarrow Hall Estate, on the shores of Lake Ullswater, has been sold under the hammer to the Rev. C. J. Gordon, vicar of Crosby Ravensworth, Westmoreland. The price works out at about £13 an acre.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Ad.—Adjudication.]

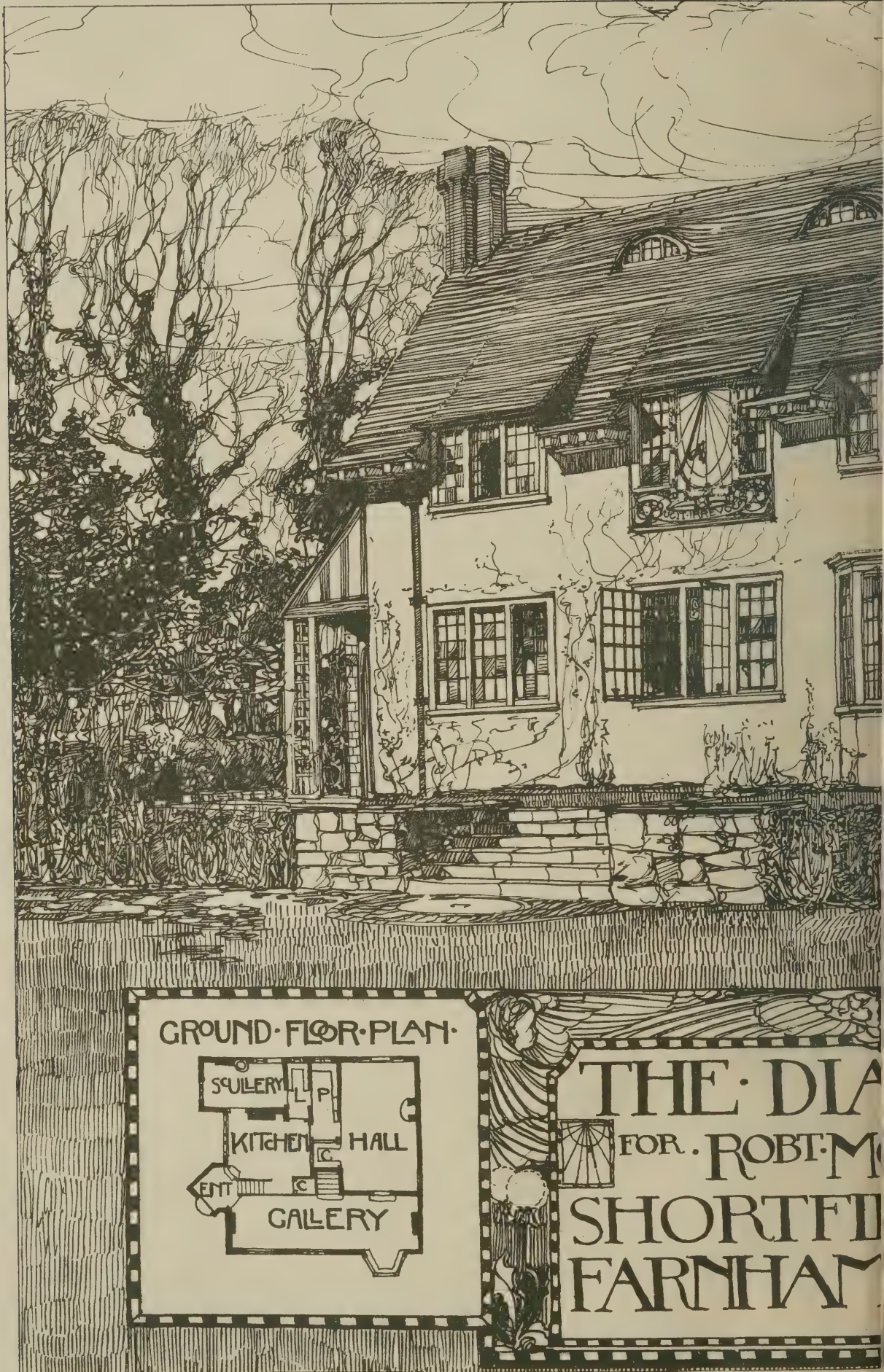
DURING THE WEEK ending August 5th fourteen failures in the building and timber trades in England and Wales were gazetted.

E. NICHOLSON, civil engineer, Staines. Adj. July 26th.
F. BEAVIS, builder, Sonning. R.O. July 28th.
F. ROBINS, builder, Farnham. R.O. July 26th.
J. PORTE, builder, Hull. R.O. July 27th.
W. W. STEVENSON, builder, Kidderminster. Liabilities £16,912. Debtor claims that there is a surplus of £379.
J. A. ODIE, builder, Kidderminster. Gross liabilities £6,490; £2,027 expected to rank; assets £1,271.
C. E. SAVERY, architect and surveyor, Richmond. Liabilities £1,100; assets £900.
I. J. ESTWICK, contractor, Baldock. P.E., C.C., St Albans, Aug. 23rd, at 10.30.
W. H. OLDING, plumber, Fletton P.E., Peterborough Law Courts Sept. 23rd, at 12.
B. DRAKE, plumber, Lutterworth. P.E., The Castle, Leicester, Sept. 16th, at 10.
W. H. FURNIVAL, builder, Wolverhampton. R.O. July 26th.
STREETER BROTHERS, cartage contractors, Croydon. P.E., Croydon C.C., Aug. 10th, at 11.
T. WILLIAMSON, plumber, Birmingham. R.O. July 25th.
SPETCH & THOMAS, engineers, Bradford. R.O. July 29th. First meeting, O.R.'s. Bradford, Aug. 12th, at 3. P.E., Bradford C.C., Aug. 17th, at 10.
WARNER & Co, builders and electricians, London. W. R.O. July 28th. First meeting, Bankruptcy Court, Aug. 11th, at 12. P.E., same, Sept. 24th, at 12.
J. BERRY, builder, Kenilworth. First meeting, O.R.'s, Coventry, Aug. 10th, at 11. P.E., Shirehall, Warwick, Aug. 12th, at 2.
H. R. DODDS, builder, Bristol. First meeting, O.R.'s, Bristol, Aug. 10th, at 11.30. P.E., Bristol Guildhall, Sept. 30th, at 12.
J. APPELGADE, builder, Rugby. Gross liabilities £1,640; £334 expected to rank for dividend; estimated deficiency £128.
FLEW & Co, builders, West Kensington. Unsecured debts £4,919; debts fully secured £125,829; debts partly secured £700; estimated surplus £24,541, subject to realization. The debtors, therefore, assert that they are not insolvent, their present position being due to their temporary inability to realize their properties.

Complete List of Contracis Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Aug. 11	Nottingham—House	Health Committee	A. Brown, Guildhall, Nottingham.
" 11	Redditch—Chimney	Urban District Council	B. Perrins, Surveyor, Redditch.
" 11	Cliffe—Erection of Premises	Co-operative Society	A. E. Loach, Architect, Northcote Road, Strool.
" 12	Bagshot—School	Surrey Education Committee	Jarvis & Richards, 36 Victoria Street, Westminster.
" 12	Huddersfield—Hippodrome	Northern Theatres Co., Ltd.	W. Cooper, 4 Kirkgate Buildings, Huddersfield.
" 12	Carlisle—House	R. Black & Son	R. Black & Son, West Wall, Carlisle.
" 13	Cleethorpes, Lincs.—Church	—	Mr. Brumptions, 43 Grimsby Road, New Cleethorpes.
" 13	Colchester—Kiln	—	J. W. Start, Architect, Colchester.
" 13	St. Mabyn, Cornwall—Pointing Tower, &c.	—	J. J. T. Andrew, St. Mabyn, Cornwall.
" 15	Aberdare—Hall, &c.	—	J. L. Smith & Davies, Architects Aberdare.
" 15	Manselton, Swansea—Church	Rev. C. C. Lindsey	E. M. B. Vaughan, Architect, Cardiff.
" 15	Pontllynn, Wales—Four Cottages	W. A. Morgan	W. A. Morgan, Picton Hotel, Pontllynn.
" 15	Whitchurch, Salop—Alterations, &c., to the Union	Guardians	W. Webb, Architect, Whitchurch.
" 16	Perth—Tramcar Depot	Corporation	J. Begg, Town Clerk, City Chambers, Perth.
" 18	Bath—Sorting Office	Commissioners of H.M. Works and Public Buildings	H.M. Office of Works, Storey's Gate, London, S.W.
" 18	Poulton, Cheshire—Boundary Wall at Gasworks	Urban District Council	J. H. Crowther, Gasworks, Poulton.
" 19	Alderney, Channel Islands—Coastguard Buildings	Admiralty	Superintending Civil Engineer, H.M. Breakwater, Portland.
" 19	Whitlands, Devon—Coastguard Houses, &c.	Admiralty	Superintending Civil Engineer, H.M. Breakwater, Portland.
" 19	Osborne—Buildings	Commissioners of H.M. Works and Public Buildings	Clerk of Works, Royal Naval College, Osborne.
" 20	London, S.E.—Repairs to Offices	Bermondsey Board of Guardians	Newman & Newman, 31 Tooley Street, London Bridge, S.E.
" 20	Cloughjordan, co. Tipperary—Bell-tower to Church	—	Parochial House, Cloughjordan.
" 23	Liverpool—Sorting Office	Commissioners	Secretary, H.M. Office of Works, Storey's Gate, London, S.W.
Sept. 2	Lowestoft—Covered Markets, Pump House, &c.	Great Eastern Railway Co.	Engineer, Liverpool Street Station, E.C.
" 6	Ponders End—Additions to School	Enfield Education Committee	G. E. T. Laurence, 22 Buckingham Street, Adelphi, W.C.
" 6	Ponders End—Block of Schools	Enfield Education Committee	G. E. T. Laurence, 22 Buckingham Street, Adelphi, W.C.
ENGINEERING:			
Aug. 11	Portland Bill, Dorset—Lantern on Lighthouse	Corporation of Trinity House	Trinity House, E.C.
" 11	Fulham, S.W.—Iron Fire-Escape Staircases, &c.	Guardians	A. Saxon Snell, 22 Southampton Buildings, W.C.
" 12	Rye, Sussex—Gas Engines	Corporation Waterworks	W. Dawes, Bank Chambers, Rye.
" 12	London, S.W.—Permanent Way Materials	—	Crown Agents for the Colonies, Whitehall Gardens, S.W.
" 13	Tylorstown, near Wales—Pit	D. Davis & Sons	D. Davis & Sons, Ltd., Colliery Office, Ferndale.
" 15	Bristol—Cattle Platform and Pens, &c.	Docks Committee	W. W. Squire, Engineer's Office, Cumberland Road, Bristol.
" 15	Carshalton—Fire Appliances	Urban District Council	W. W. Gale, Council's Surveyor, District Council Offices, High Street, Carshalton.
" 15	Leeds—Alternators, &c.	Corporation	J. B. Hamilton, Standard Buildings, City Square, Leeds.
" 15	Glasgow—Branch Railway	Glasgow and S.W.R. Co.	Engineer's Office, St. Enoch Station, Glasgow.
" 16	Warrington—Alterations to Swing Bridge	Corporation	Preece & Cardew, 8 Queen Anne's Gate, Westminster, S.W.

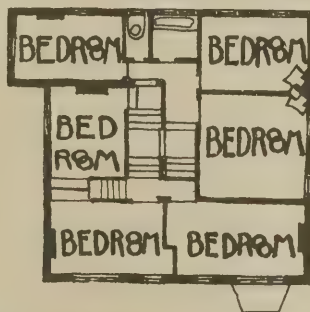
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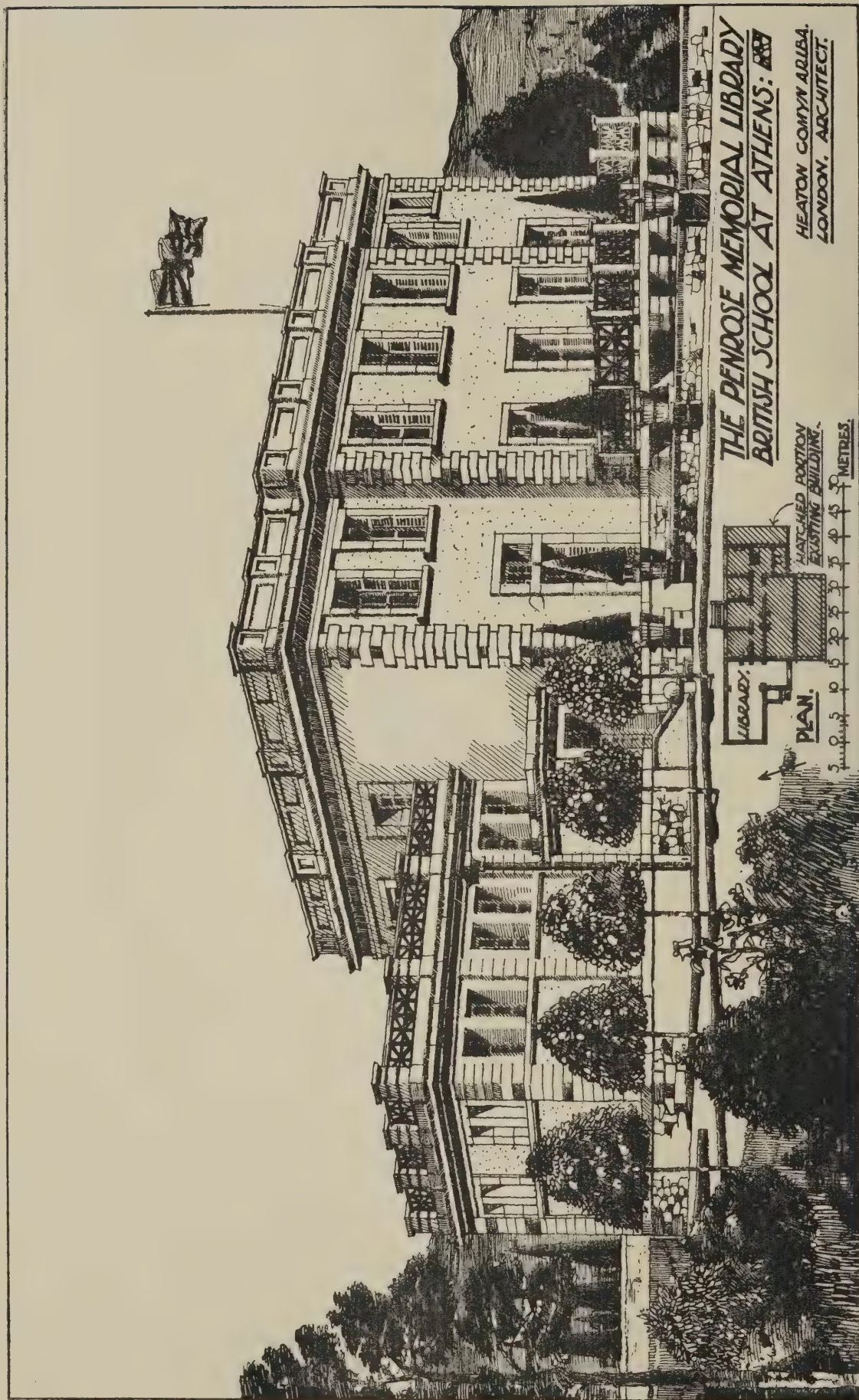
THE HOUSE.
 RILEY'S SQUARE.
 D. COMMON.
 HAROLD FALKNER.
 ECIT. ET. DELIT.

FIRST FLOOR PLAN



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PROPOSED HOUSE AT HINDHEAD, SURREY.

REGINALD MORPHEW, ARCHITECT.

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THE
BUILDERS' JOURNAL
AND ARCHITECTURAL RECORD.

August 17, 1904. Vol. 20, No. 497.

6, Great New Street, Fetter Lane, E.C.

Summary.

An American consulting engineer recommends the following provisions against fire:—(1) A wall either of brick or cement-concrete; (2) properly designed window openings and window casings; (3) good shutters in the windows. Ribs on steel-plate shutters need to be very carefully designed, as they are liable to increase the liability to warp, with the result that an opening is made through which the flames will pass. He considers the ordinary shutter of tin-clad wood will not endure for more than about half an hour a temperature of 1,500 degs. Fahr., which limit is often exceeded. (Page 83.)

Hildesheim is one of the quaintest of North German towns. The old buildings in its streets, abundant in carved timber work, are a constant source of pleasure and the cathedral is of much interest. (Page 80.)

The Prix de Reconnaissance des Architectes Americaines established at the Ecole des Beaux-Arts twelve or fifteen years ago is not popular, and consequently operates a little to the disadvantage of the Americans who frequent the school, whereas it was expected that this monetary prize would make them amongst the most welcome of the many foreigners there. (Page 81.)

Where suitable conditions exist, a hydraulic ram forms an especially valuable means of water-supply for household, garden or agricultural purposes, as it is extremely cheap in its first cost, requires little fixing, occupies but a small space, costs practically nothing for maintenance, needs no oiling and requires a minimum of superintendence. (Page 90.)

There seems to be a great opportunity for British firms to supply the chief needs of the building trade in South Africa, especially as regards small dwelling-houses, sheds, stores, workshops, &c. Steelwork is also in demand, for in certain parts of Johannesburg, Cape Town, Durban and other leading centres land is as dear as in London or New York, and high buildings are an economic necessity; consequently structural steelwork is in good demand. There is also a market for makers of brick plant, &c. (Page 87.)

The German official regulations governing armoured concrete construction are entirely commendable. They sufficiently safeguard the public, and encourage invention and progress in the use of this new form of construction, while at the same time they are free from any unnecessary restrictions or unreasonable inspection likely to cause annoyance. They give rules for the calculation of concrete-steel members. The coefficient of elasticity of steel is placed at 15 times that of concrete, and in columns a factor of safety of 5 is required in the steel and 10 in the concrete. Tensile stresses are required to be taken by the steel alone. The common theory of flexure is prescribed for the calculation of beams. (Page 85.)

Municipalities as their own Contractors.

THE Sunderland County Borough Council decided last week to appoint a committee to consider and report upon the advisability of establishing a department under the Council to carry out the construction of Corporation buildings and building repairs. The practical unanimity with which the remarks of the proposer of the motion were received give them some value as showing the general trend of ideas of the Sunderland councillors. To quote the local paper: "He considered that the time was at hand when the Corporation should carry on its own buildings without the intervention of outside contractors. He pointed to the fact that in the near future the Corporation would have at least £100,000 worth of building work going on, and at the present time they had over £12,000 worth on hand. At the asylum, at the borough sanatorium and at the Hendon Road baths the Corporation was executing work with great satisfaction and cheaper than contractors." It was elicited that the house built at the asylum by the Corporation was not according to the original specification on which contractors were asked to tender. This proposal to add another works department to the list of municipal undertakings can only be looked at askance. The examples furnished by the London County Council, the Sheffield Corporation, and several smaller municipalities, such as the Battersea and Fulham Borough Councils, are not such as warrant the establishment of others. The chief claim of the advocates of this policy, namely, that it effects a monetary saving to the ratepayers, has not been upheld. The losses in all the places above mentioned have been considerable. On the whole, the work has been well done, and in some instances perhaps better than it would have been by outside contractors, though in others there has been shirking due to the managing officials trying to avoid or minimize a loss. The ultimate reason of the monetary loss is not far to seek; it consists in the restriction of the output by the workmen engaged. So long as no regular department is established, savings may be effected, for the workmen have not come to regard the work as a regular "soft job." The election of members of municipal bodies in most cases depends upon the votes of the working classes, and it naturally follows that they pay great regard to any complaints from workmen, especially when backed by the trades unions. The consequence is that foremen and higher officials, feeling that complaints from dissatisfied

men will be listened to, and themselves perhaps reprimanded if they cannot fully justify their action in discharging them, allow the supervision to become lax and the men to take things easy and idle about. Workmen, too, are not averse to dawdle, for having had the doctrine preached to them that the less they do the more work there will be for others, they complacently adopt this short-sighted and ignorant policy, not realizing the economic law that the less work done the poorer the nation becomes as a whole, and proportionately worse for themselves. They only do themselves harm in the end. No nation can afford to tolerate idlers. It is in the supervision where the contractor succeeds and municipalities fail—the contractor gets more out of the workmen. With public officials there is a want of responsibility and a general accretion of unbusinesslike red-tape methods and procedure. Undoubtedly things would be improved if the works managers were placed in the positions of contractors and allowed an absolutely free hand in the management of their own departments, without the interference of a committee, very much like the manager of the Glasgow Tramways is allowed to do—and these tramways are admittedly among the most successful of municipal undertakings. It is just here where the London County Council with its committees that have a share in the management is at fault. The West Ham Borough Council has placed its works manager in the position of an outside contractor, and it may have been noticed by our readers that in competition with private firms he has both lost and gained jobs, though, so far as we hear, the labour party is so strong in this district (having dominated it for many years) that there is just as much difficulty in getting the men to do as fair a day's work as they do for private contractors as with other municipalities. But the system of putting the manager in competition with private contractors does allow fair comparison to be made as to losses or profits, which the system of the London County Council (whereby jobs are not put up to public tender) does not. The municipalization of private enterprise has been gradually increasing by insidious methods, while the electorate of this country is averse to Socialism and the regulation of all industry by the State; and these municipal works departments, though at first sight they may appear to put money into the ratepayers' pockets, are incongruities, so that we trust Sunderland will reject the proposal before it.

HANOVER AND HILDESHEIM.

By CHARLES R. GILCHRIST.

WHILST the old homeland possesses infinite attractions apart from its natural beauty, in time-honoured cathedrals, stately homes and ancient towns, it is well sometimes to see what our Continental neighbours can offer us in exchange, and, as an example of this, some of the mediæval towns of northern Germany are well worth a visit.

Hanover has a familiar sound to us, its history being interwoven with our own, and we cannot but feel a more than ordinary interest in visiting this flourishing town, renowned for its educational institutions and academies of art, to which, as well as to the energy of its citizens, it owes so prominent a place in the German Empire.

Of modern Hanover it will suffice to observe that its fine streets and buildings, and its noble parks and gardens, are attractive to all visitors, but the quaint and picturesque old streets and buildings of the Hanover now passing away will be of special interest to the architect or artist who seeks to further his knowledge of mediæval work. Conspicuous is the Town Hall (Rathaus) a fine example of brick architecture dating from 1435, but of late years considerably restored. Another noteworthy building is the Market Church (Markt Kirche), one of the oldest and finest churches in the town, with its tower 313 ft. high, though one has to note that it also has been restored and subjected to modern improvements. The Aegidien Kirche is another of considerable interest, built in 1347; it has three naves and a porch, with a tower in the Renaissance style, added in 1702.

Quitting the old part of the town, a visit to the magnificent Herrenhausen Allee is a refreshing change. This avenue is $1\frac{1}{2}$ miles in length, of great width, with four rows of lime trees, and terminates in the fine Castle Garden (Schloss Garten), laid out in the French style, with wonderful fountains, the largest of which throws a stream of water from 165 ft. to 215 ft. in height. The Guelph Museum, in that vicinity, contains a large collection of old armour, weapons and costumes of the sixteenth and seventeenth centuries, also relics from the old churches of Hanover of the twelfth century and later periods. The picture galleries exhibit, amongst other works, many portraits of our own Royal line—of the Electress Sophia, George I., George II., George III. and others.

To Hildesheim, that quaintest of North German towns, is but a pleasant ride in train or electric car from Hanover, being about fifteen miles distant. This ancient town is not inaptly called the "Nuremberg of the North," and although one would not claim for it such attractions as the Bavarian town, it is a worthy sister in antiquity. No visitor to Northern Germany should neglect to see Hildesheim. The numerous old buildings in its streets, abundant in carved timber work, are a constant source of pleasure, and the cathedral and various churches are of much interest. The market place is surrounded with fine examples of mediæval architecture—more especially the Town Hall with its fine old council chamber on the upper floor, and the still more quaint Guildhall of the Butchers ("Knochenhauer-Amthaus"), with its wonderful compilation of storey over storey, resplendent with ornate carvings, and an abnormally high pitched gable (see p. 84).

In the same square are situated the "Templerhaus" and "Haus Wedekind" of the fourteenth and fifteenth centuries—illustrated on the opposite page—the former having a turretted and castellated appearance, and the latter rich in gabled attics

and carved timber work; whilst the scene is much enhanced by the old fountain in the centre of the square, a lonely witness of the days when people thronged the busy mart.

But the cathedral is perhaps the principal sight in Hildesheim, and although its exterior is little worthy of attention, the interior is of much interest.

It may be termed the birthplace of Hildesheim, and with its foundation is associated the legend of the 1,000-year-old rose-tree, still to be seen flourishing around the chancel walls: the antiquity of the tree, however, is a matter of doubt, experts estimating its age at 200 years, although tradition assigns its origin to the remote period, owing to the fact that the chancel walls, which protect its roots, are known to date from the twelfth century.

The cathedral is rich in treasure, but most noteworthy perhaps is the "Christussäule" at the side of the choir, a column of bronze made in 1022 (in imitation of the Trajan Column in Rome) representing the life of Jesus Christ, and executed in bas-relief. The large candelabrum suspended from the ceiling of the nave is a masterpiece of the metal-worker's art, and dates from 1045, representing with its pinnacles, towers and gates the Heavenly Jerusalem.

Many other objects of interest are to be seen in and around Hildesheim, but I must leave these to the reader's own personal investigation, hoping that these brief notes may cause others to visit them.

To those who are unfamiliar with the northern towns of Germany I think the accompanying illustrations will come as a surprise.

AMERICAN NOTES.

IN recent issues of our American contemporaries several subjects of interest to our readers have been dealt with, editorially and otherwise. We propose now to give the substance of these matters.

First we come to the question of

Architects' Charges in America.

These are discussed by the "Architectural Review" of Boston, which takes up the cudgels against a contemporary's arraignment of the existing system.

"The history of the 5 per cent. rule is immaterial. The contention that it cannot be applied to all classes of buildings is a familiar one. Nor is it so applied. 'For new buildings costing less than 10,000 dols. (£2,000), and for furniture, monuments, decorative and cabinet work, it is usual and proper to charge a special fee in excess of the above. For alterations and additions to existing buildings the fee is 10 per cent. upon the cost of the work.' So reads the revised schedule of the American Institute of Architects. It is indeed true that 'heating, plumbing, electric wiring, steel constructions and all the thousand-and-one improvements and appliances now to be located and studied, to the great complication of plans' have vastly increased an architect's work upon certain types of buildings. Our contemporary admits, however, that buildings having become more expensive because more complicated, the present schedule is fairly satisfactory. We think so, indeed, for the reason that 'where heating, ventilating, mechanical, electrical and sanitary problems in a building are of such a nature as to



THE RATHAUS AND MARKET CHURCH, HANOVER.



HILDESHEIM: TEMPLERHAUS AND HAUS WECKIND.

require 'the assistance of a specialist, the owner is to pay for such assistance.' Yes, and the question is how much the owner is to pay. Considering that the full services of a technical expert include the production by him of all the drawings required for his part of the work, and superintendence of that part, it seems to us that the fair commission upon the cost of such work is not 5 per cent., because the architect incurs almost no expense on account of it, but is rather such a percentage as represents the architect's responsibility in selecting his expert assistants and co-ordinating their work with the general undertaking.

"The School-house Commissioners of Boston allow the architects of school-houses $2\frac{1}{2}$ per cent. as commission upon the cost of the heating, plumbing and ventilating systems in each building, which are under the direct charge of engineers appointed by the Commissioners and required to co-operate with the architects. It is probably inevitable that simple constructions and work of repetition should be 'vastly more remunerative than complicated structures and work requiring careful study in all its parts.' But this latter class of work surely gives far greater pleasure to the idealist in architecture and far greater opportunities to establish or increase his reputation as a designer. There is, however, a system in current use which tends to equalize the architect's exertions and his compensation as follows. It is agreed that the actual cost of drawings, including, of course, a proportion of the office rent and general expenses, shall be estimated as the basis of the architect's commission, and that he shall receive twice the amount of his actual outlay. His commission represents 50 per cent. office expenses and 50 per cent. nett payment for his services. But the amount so paid has no fixed relation to the cost of the work to the client and is directly governed by the cost of producing the drawings and specifications necessary for

execution. It is too early yet to say that this innovation in charges has justified itself both to client and architect.

"It has always been charged against the 5 per cent. commission that it did not discriminate between 'the services of the novice and those of the experienced and expert,' the work of the well educated and that of the less well trained, the claims of the successful and those of the unsuccessful. Its justification is that it has relation only to the amount of the outlay. A certain responsibility measured in dollars is paid for by a definite proportion of that sum, but questions of training, experience and success are determined, not unjustly, by the principle of competition. A young man is more ambitious and can give more time to a given job; an older man has a better knowledge of materials and better judgment; a trained man generally has better taste; an untrained man more originality. These matters are taken into account before employing an architect, and, of course, an architect who is already busy is more in demand on that account with certain people and less with others. The most profitable quality for the American architect to-day is executive capacity. Such ability commands the highest returns, because the demand for men to carry out important work and lots of it in a very short time is greater in America than the supply of such men, and far greater than any conscious demand for creative artistic genius.

"It is in vain to deplore, as does our contemporary, that the Institute should approve 'the principle that the services and ideas of an architect are valuable in proportion to the cost of carrying them into execution,' that a 'design in a cheap material earns a double fee by being executed in a material twice as expensive, and architects under this rule are paid for wasting their clients' money and punished in pocket for saving it.' There is no such principle involved in the

5 per cent. rule. We maintain, as before, that architects' services are paid for in proportion to the responsibility involved in the work, and this responsibility is measured by the cost. As for wastefulness, even assuming an utter absence of conscience, is there a more certain way of earning another job from a client than by employing his money to good accounts? The actual experience of his clients determines sooner or latter the amount and the kind of work that an architect will be called upon to do. Unquestionably, however, the great variety of demands made upon architects tends to produce specialists, and these in their specialities have a proper and usual advantage over the so-called general practitioners. The development of a good speciality, whether it be offices, churches, schools, hospitals or even factories, will tend to bring an architect larger returns from his practice by making each individual task easier and less expensive, and will sometimes lead to exceptional achievements being rewarded by exceptional fees."

Turning now to the "American Architect," we find some interesting observations in regard to

American Students at the Paris Beaux-Arts.

Says our contemporary:—"It is very regrettable that the amiable and seemingly admirable scheme for expressing in a graceful way the sense of obligation American architects entertain towards the French Administration of Fine Arts does not work as satisfactorily as was expected. The Prix de Reconnaissance des Architectes Americaines, that was established at the École des Beaux-Arts some dozen or fifteen years ago, is not popular, and being unpopular it operates a little to the disadvantage of the Americans who frequent the school, whereas it was the expectation that it would make them amongst the most welcome of the many foreigners who enjoy the artistic hospitality

of the National School of Fine Arts. The prize, a moneyed one, is really of considerable value from a Frenchman's economic point of view, and it was but natural that Americans, who like money prizes, should believe that Frenchmen would like them too. But there are things that the artistic temperament of a Frenchman holds of higher value than money: art itself for one thing and glory for another; and to a pupil at the Ecole des Beaux-Arts both these things are summed up in the single expression, the Prix de Rome, which each pupil dreams of winning some time and so prolongs the years of his pupillage up to the very age limit. Unfortunately the winning of the American prize gains for the winner none of the coveted "*valeurs*" which are needed to secure an advance from the second to the first class, to obtain the diploma, or to secure eligibility as a competitor for the Prix de Rome itself. It would seem that this blemish on an otherwise admirable scheme might be removed if a proper representation were made to the Ministry of Fine Arts by the American subscribers to the fund. It was certainly their desire and expectation that the prize should be as highly cherished as any, and at the time of forwarding the fund if expression had been given to the desire that the winning of the prize might count as a "first mention," if not as a "medal," the aspiration would surely have been heeded. The power to make the change must still lie with the Ministry of Fine Arts. It is obvious that as the students must win values they, or most of them, will not waste time on a competition which will yield them none. In 1901 the American prize was not even awarded to anyone, and last year nine out of the fifteen who entered were put *hors de concours*—that is, they did their work too carelessly or else departed from the programme through wilful indifference.



HILDESHEIM CATHEDRAL.

Registration in America.

Registration is still a great topic among architects in this country. The possible changes it might effect are discussed without end, so that it is instructive to refer to the actual working of the scheme in some of the American States. The latest particulars in regard to the matter reach us in the form

of a letter by Mr. Peter B. Wright, secretary of the Illinois State Board of Examiners of Architects. He says:—

It is stated in a recent publication that a decision handed down by the Supreme Court of New Jersey is being used by some papers as an argument against the laws which prevail in some States providing for the licensing of architects.

In the case referred to the Board had refused the application of Newman H. Raymond, of Jersey City, for an architect's licence on the ground that Mr. Raymond was not an architect, but merely a builder. After reviewing the facts the Court set the decision of the Board aside and ordered a licence to be issued. The result of this case is not to be wondered at, if one reads the law of New Jersey relating to such matters. Section 10 of the law says:—

"Any person who shall at the time of the passage of this Act be engaged in the practice of architecture in this State, and who shall present to the State Board an affidavit to that effect . . . shall be entitled to receive such certificate upon the payment to the said Board of a regular fee of 5 dols."

It will be seen by this that the Board has no discretion in such cases, and was obliged to grant all the licences applied for at the time the law went into effect on July 1st, 1902, on presentation of an affidavit from the applicant. The New Jersey law further states in section 12:—

"Any person whose certificate shall be refused or revoked by said State Board shall have the right to appeal by *certiorari* to the Supreme Court for a review of such action, and the Supreme Court is hereby authorized and empowered to review and correct the action of said State Board, and the State Board shall forthwith carry out the judgment of the Supreme Court on such review."

The decision thus rendered under these clauses can have no bearing upon the efficiency of the Illinois law, which was passed in 1897. That law gave the State Board discretionary power in such cases, and this discretionary power in granting licences to those who claimed to be practising architects at the time the law went into effect was sustained by the Appellate Court of Illinois in its decision of the case of *Harbers v. The*



HILDESHEIM CATHEDRAL: THE THOUSAND-YEAR-OLD ROSE TREE.

Illinois State Board of Examiners of Architects, rendered October 2nd, 1900. The claim of Harbers for a licence was based on exactly the same grounds as those made by Raymond in New Jersey. In its decision the court quoted the language of the law in the following sentences:—

"In the language of the law a person desiring a licence without an examination must by affidavit show to the satisfaction of the State Board of Examiners of Architects that he or she was engaged in the practice of the profession of architecture on the date of the passage of this Act. This certainly leaves some discretion to be exercised by the Board, and while a mandamus would lie in a proper case to compel the Board to act upon an application, yet, in the absence of a wrongful abuse of power, amounting to a fraud against the rights of the applicant, it would not lie

features to avoid in the future. First of all he speaks of the importance of knowing what are the temperatures reached in great fires. He found that in the "non-fireproof" buildings at Baltimore it corresponded to a dull redness, becoming a little more than that where fuel and air currents were favourable, but very rarely reaching the fusion point of the most fusible cast-iron, and then only on exposed corners and small areas; while in the "fireproof" buildings the maximum heat rarely exceeded 1,800 degs. Fahr., "and as one lesson from the Baltimore fire I should say that 1,700 degs. maintained for one hour was a fair general standard for the testing furnace of an underwriters' laboratory, with about 2,100 degs. as the extreme limit over small areas and for a short time."

Another feature which very distinctly marked the extreme temperature reached

stand the fiercest heat, but we do need some better material than pine wood to fill it with." Continuing, he says:—

"I was very much interested in the efficiency of the plain steel-plate shutters on the inside of the windows in the Safe Deposit and Trust Co. building. These kept the fire out very successfully, notwithstanding that the large non-fireproof building of the 'Baltimore Sun,' which was entirely wrecked and was one of the hottest parts of the entire conflagration, was only 10ft. away. The damage was so imminent that the police ordered the men to leave the Safe Deposit building and the heat melted the lead sash-weights within the cast-iron window-casings, destroyed the sash and glass, and chipped the brick walls, but the damage on the interior of the building was almost nothing. These steel-plate shutters were so set that



INTERIOR OF HILDESHEIM CATHEDRAL.

to compel its members to decide in a certain way."

Neither does this decision in New Jersey have any bearing upon the constitutionality of laws for the licensing of architects. It applies only to the individual case in question, and would not have arisen had the New Jersey Board been vested with discretionary power, as is the case in Illinois.

All attempts thus far made to dispute the authority of the Illinois Licensing Board have fallen to the ground.

An Engineer's Suggestions about Fireproofing.

It will be remembered that quite recently we published an important report on the great Baltimore fire by Professor Norton. The subject is one of vital interest, so that we make no excuse for again referring to it. The occasion which now presents itself is a report which we have in hand of an address by Mr. John R. Freeman, consulting engineer, delivered in New York at the annual banquet of the National Board of Fire Underwriters. Mr. Freeman spent several days studying the ruins of the fire and he says he never found so many object-lessons of what structural

was the melting of the window glass. Throughout the hottest rooms of most of the fireproofed buildings the window glass had softened enough to bend. In only a comparatively few cases had it melted sufficiently to run freely. "I remember one window in the Calvert building where the glass had apparently been heated to the point that it had run over the sill, almost as water would run, and in the 'Herald' building a large sheet of wire-glass from the skylight had fallen across a bar, in about the shape that a wet limp cloth would assume."

A matter which greatly interested Mr. Freeman, in studying the Baltimore ruins, was to see the effect of the fire on the fire-shutters. These did not give a very good account of themselves, "and I think it can be said, without fear of serious contradiction, that the endurance of the ordinary underwriters' shutter of tin-clad wood is limited to not more than about half an hour's endurance of a temperature of 1,500 degs. and that this limit is often passed in the heat of an ordinary conflagration. The covering material is all right and can with-

they were free to expand; they had no ribs and were of a form not likely to warp much: in fact, they warped but little, and the casing and jamb were of such form that this warping of the shutters off their seats did not open a wide crack, and there was no combustible material near them on the inside to receive their radiant heat. A steel shutter stiffened by ribs has been suggested. Ribs, however, are dangerous unless very carefully designed and attached, and, as generally applied, they increase the liability to warp."

Mr. Freeman thinks that the best place for shutters is inside the glass.

Proceeding, he next turns to wire-glass and water curtains. As to the former, he says it is an excellent material, but it has its limitations, the chief of which is perhaps its inability to stop the passage of radiant heat. "If you have a stock of dry goods, or wooden ware, or baled cotton or hemp just inside a wire-glass window without shutters, and there is a hot fire across the street, these can probably be set on fire with much promptness by the radiant heat passing through the glass. For safety, there must be something which will stop the radiant heat, and that

Obituary.

Mr. S. Briant, builder and decorator, of Uxbridge, died recently at the age of seventy-seven.

Mr. J. S. Stewart, of the firm of Messrs. Lanchester, Stewart & Rickards, architects, London, died recently at the age of thirty-eight, from heart trouble. He was associated with the firm in many important designs—including that for the new town hall and law courts at Cardiff.

Mr. George Lynn, head of the firm of G. Lynn & Son, builders, Brighton, died last Wednesday at the age of sixty-nine. He superintended many large contracts in Brighton and district and was also associated for many years as surveyor and valuer with local building societies. About two and a half years ago he retired from business.

Mr. Joseph Norris, head of Messrs. Norris & Sons, builders, of Sunningdale, died recently. He was in his eighty-first year and had been at Sunningdale for thirty years. He built many churches in different parts of the country, besides public institutions such as the Gordon Boys' Home and private mansions. He executed the work at Lee Park for the late Mr. Whitaker Wright. He personally superintended his jobs and would travel over 1,000 miles per week, and at some periods paid £1,000 per week in wages alone.

Walsall's new Town Hall is now nearing completion. A staff of workmen averaging about 200 has been engaged on the work, in the execution of which something like $3\frac{1}{4}$ millions of bricks, 8,000 tons of stones, 60 tons of lead and 450 tons of concrete have been used. The design is by Mr. James S. Gibson, of London, and the contractors are Messrs. Armitage & Hodgson, of Leeds. The total cost will probably amount to about £80,000.



HILDESHEIM: KNOCHENHAUER-AMTHAUS (GUILDHALL OF THE BUTCHERS).

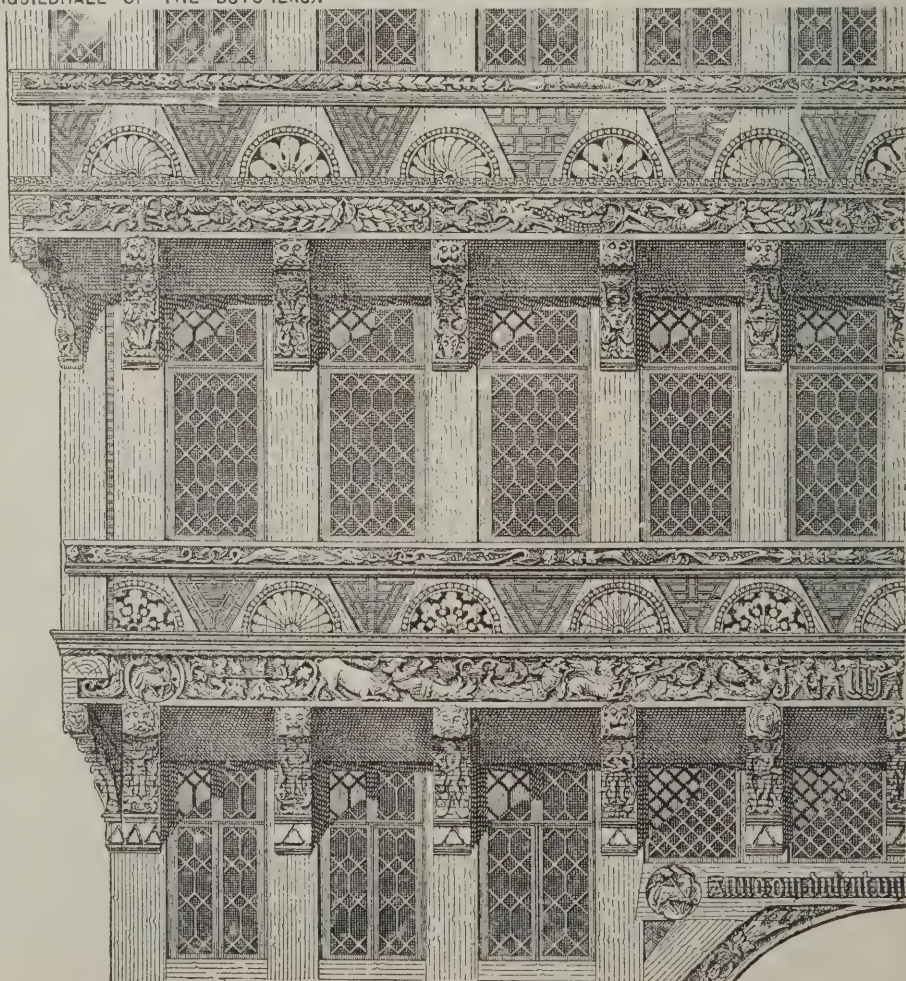
can only be in the form of a shutter, and, by virtue of stopping the heat, the shutter will become hot. The case with the water curtain is very much the same as with the glass.

"The window sprinklers came in for a good deal of praise in certain quarters in Baltimore. I took particular pains to investigate them and I have no doubt they did some good, but they are not entitled to anything like the glory that is claimed for them. The inside ordinary automatic sprinkler did very much more good.

"In short, if you want to provide against an exposure-fire, I believe that the only way to do it is, first, by a wall either of brick or cement-concrete; second, by properly designed window openings and window casings; and third, by good shutters in those windows. In the absence of shutters, automatic sprinklers, supplemented by heroic efforts with hose streams on the inside, may sometimes save the day, with great expense for water damage; but where exposures are bad a good shutter on a proper window should be the first care of architect and owner."

Finally Mr. Freeman speaks of the fire-resisting qualities of Portland cement concrete, which he found to be excellent—in fact, he believes this to be the best material for fire-resisting construction.

Romney's House, No. 32, Cavendish Square, W., is to be pulled down. The studio, a room only 18ft. square, with what must once have been charming decorations, was built by Cotes. It is much to be regretted that so interesting a building has to go; but it has been so much neglected by a succession of tenants, and is now in such bad condition, that the decision is not surprising.



DETAIL OF GUILDHALL FRONT.

REINFORCED CONCRETE.

German Official Regulations.

THE regulations as to reinforced concrete in building construction issued in the form of a circular by the Prussian Minister of Public Works are a most important contribution to the subject and deserve the closest attention of architects and engineers in this country.

These regulations are entirely commendable. They are based upon a recognition and understanding of the real nature of armoured-concrete construction; they are so framed that invention and originality of design and technical methods of execution are not unduly interfered with; and they are drawn up with due regard to avoidance of annoyance by unreasonable inspection, &c., which too often is a feature in our by-laws, causing delay and increase of cost. The latitude which these regulations give the officials to grant concessions where engineers or contractors can show good reasons for modification is particularly worthy of note, being a model of what our own building by-laws should be, especially in rural districts, for the red tapeism of standing by the strict letter of the law is a crying evil. The regulations officially acknowledge the pretensions of advocates of concrete-steel construction that, provided proper care is taken in the choice and admixture of materials and in the execution of the work, the stresses in members constructed of these two materials in combination can be very exactly determined, and they specify rules and give data for the design of structures on this system. It will be seen that the Prussian authorities take the coefficient of elasticity of steel as fifteen times that of concrete, whereas ten times is considered sufficient by many; but the regulation is on the right side for safety, and as the authorities express their willingness to allow a concession on sufficient showing we see no reason for complaint. Again, in columns it is stipulated that the concrete shall not be stressed beyond $\frac{1}{10}$ th its breaking stress nor the steel beyond $\frac{1}{10}$ th. This is also on the side of safety, but most engineers would probably be ready to work with a much smaller margin of safety where ordinary care is exercised in execution. It is a wise provision that all the tensile stresses in a beam shall be treated as being resisted wholly by the steel reinforcement, for while well-made concrete may theoretically be capable of offering a substantial resistance to tensile stress, the impossibility of determining cracks or weakness in the concrete prevents any reliance on this in structural calculation. The common theory of flexure by which the intensity of bending stress varies directly as the distance from the neutral axis is prescribed by these regulations for beams, in view of its simplicity. Some authorities, we might point out, have endeavoured to supplant this common theory with a complicated one or an arbitrary law such as the variation of the intensity according to the ordinates of various curves, in view of the observed result that the common theory of flexure does not hold good throughout when an armoured-concrete beam is tested to failure; but considering that there is just as much, if not more, variation from the same theory in the case of steel beams tested to failure, the wisdom of using such a simple method of calculation within the limits of ordinary working stresses for this new method of construction is apparent.

It is also stipulated that stresses shall be conveyed to the steel reinforcement by the form of the latter as far as possible, but where this cannot be done the adhesive stress of the concrete for the iron shall be computed. This regulation is drafted in view of the fact

that actual experience has shown that while the bond between the steel and the concrete is of material value, and may even be high, its amount is frequently uncertain, and with a view of giving to the steel reinforcement the stress which it must carry the form of the steel bars employed has become of great importance.

The regulations, divided into three sections, are as follows:—

I. Examinations of Plans and Computations; Construction; Acceptance.

Section 1.—1. The erection of structures or parts thereof of reinforced concrete must be preceded by a special examination by the building authorities. For this purpose an application for a building permit for a structure to be built, in whole or in part, of reinforced concrete must be accompanied by drawings, static computations and descriptions, showing the general arrangement and all important details.

2. In the description shall be stated the origin and the qualities of the materials to be employed for making the concrete and the proportions in which they are to be mixed.

3. The above drawings and statement shall be signed by the owner and the contractor.

Section 2.—1. The qualities of the materials to be used for concrete shall, if so required, be certified by a certificate of an official testing laboratory. Such certificates shall generally not be older than one year.

2. Only Portland cement fulfilling the Prussian specifications shall be used. The certificates of its quality shall contain statements as to its constancy of volume, time of setting and fineness, as well as tensile and compressive strength.

3. For making concrete only a sharp sand, gravel or other ingredient of suitable size shall be used which has by experience been found to be satisfactory.

4. The compressive resistance which the concrete to be employed shall attain after twenty-eight days must be stated in the accompanying description (section 1, 1).

Section 3.—1. The method of the static computation followed must at least ensure the same safety as the computation according to the rules in Part II. of these regulations.

2. In the case of untried methods of construction the building authorities may first require preliminary trial constructions and load tests.

Section 4.—1. The building authorities may determine the qualities of the building materials which are employed by the aid of an official testing laboratory, or in any other way they may deem suitable, and they also may test the strength of the concrete made. The latter may also be tested on the building site by a concrete press, the reliability of which is certified by an official testing laboratory.

2. The concrete specimens to be tested shall be of cubical form and, according to the size of the blocks used, shall have sides 7 in. or 11.8 in. long. The test specimens shall be marked with the day of their making, be stamped for recognition and be kept for the required period according to the directions of the building authorities.

3. The cement shall be delivered to the work in original packages.

Section 5.—1. Concrete shall, as a rule, be proportioned by weight.

2. The proportioning may, however, also be done by volume, using a separate gauging box for each material. Each of these boxes shall, when filled full and struck level, contain the prescribed proportions by weight, which shall be proved by a reliable scale.

Section 6.—Concrete shall be mixed only in quantities required for immediate use. It shall be put in place immediately after mixing and be tamped uniformly; if laid in the consistency of moist earth, it shall be

tamped until water appears on the upper surface. Suitably shaped tampers of proper weight shall be used in tamping.

Section 7.—1. Special care shall be exercised in placing the reinforcing metal in its correct position and in surrounding it tightly with cement-mortar.

2. Concrete is to be laid in layers which shall have a thickness not exceeding 6 in., and each shall be thoroughly tamped.

3. Continuous walls shall be laid uniformly for their entire length. Care shall be taken to obtain good connections with the adjacent transverse walls. Layers which form the top surfaces of a storey must be levelled off.

4. The moulding boards must have sufficient resistance to bending as well as to shocks and vibrations due to tamping, and they shall be arranged to be removable safely after taking away their supports.

5. In removing the moulds and supports all jar and vibration shall be avoided.

Section 8.—1. In placing a new layer of concrete on a fresh one it will suffice to wet the old surface thoroughly.

2. In building on hardened concrete the old surface shall be roughened, cleaned and wetted.

Section 9.—In constructing walls and piers for buildings of several storeys, the upper storeys shall not be started before the moulds of the lower storey have been removed.

Section 10.—1. No work shall be done in freezing weather except when the influence of frost is excluded.

2. After prolonged freezing weather the work shall not be taken up again with the warmer weather until the approval of the building authorities has been obtained.

Section 11.—1. Until sufficient hardening of the concrete has occurred, the structural parts shall be protected against the effect of freezing and premature drying as well as against vibrations and loads.

2. The side-moulds of concrete beams and the moulds of floor slabs up to spans of 49 ft. shall not be removed before three days, the remaining moulds and the supports not before fourteen days from the completion of the tamping.

3. If the tamping has been completed only a short time before the occurrence of the freezing weather, special care shall be taken in removing the moulds and supports.

4. If freezing weather occurs during the hardening period, the time specified in the foregoing for hardening shall be extended by the time of freezing because of the retardation in hardening caused by the latter.

Section 12.—A daily account of the work shall be kept on the ground and be always open for inspection. Freezing weather shall be especially noted and the hour and temperature recorded.

Section 13.—1. At the final inspection for acceptance the structure shall be uncovered and accessible at the places indicated by the representative of the building authorities, to show the quality and character of construction. The building authorities have also the right to test the quality of the construction, the degree of hardening obtained and the sustaining strength by special tests.

2. To determine the degree of hardening, test specimens may be taken from the hardened material as specified in section 4, 1.

3. If loading tests are deemed necessary, they shall be made according to the directions of the representative of the building authorities. The owner and the contractor shall be notified in time of these tests, and be invited to be present.

4. If a strip of a floor panel be cut out and tested by a trial load, this load shall be distributed uniformly over the whole strip and not exceed the weight of the floor and double the live load it is computed for. If such a strip is tested without being cut out of the panel, the test load shall be increased by one-half. Thus, if g denotes the dead

load and p the live load, the test load will be for the former case $g + 2p$ and for the latter $1.5g + 3p$.

II. Rules for [Static] Computation.

(a) *Dead Load.*—1. The weight of concrete inclusive of the reinforcing metal shall be taken at 150 lbs. per cub. ft., unless another weight be definitely ascertained.

2. For floors the weight of the flooring material shall be added to the weight of the sustaining parts.

(b) *Determination of External Forces.*—1. For the members subject to bending the end moments and reactions shall be computed, according to the character of loading and support, by the formulæ for freely supported or continuous beams.

2. For freely supported slabs the clear opening plus the depth of the slab shall be taken as the span; for continuous slabs the distance between centres of supports.

3. For slabs continuous over several spans the bending moment at the centres of slabs may be taken as four-fifths the value of the moment for a freely supported beam, unless the actually occurring moments and reactions be ascertained by computation on tests.

4. The same rule holds true for beams, tee-formed beams and girders, with the exception, however, that no end moment shall be taken into account unless special structural details to ensure the fixed end be provided. The span shall be taken as the free opening plus the length of one bearing.

5. For tee-formed beams the flange shall not be considered for a width of more than one-third the length of beam.

6. For columns consideration shall be given to possible eccentric loading.

(c) *Determination of Internal Forces.*—The modulus of elasticity of steel shall be taken as fifteen times that of concrete, unless another ratio be shown.

2. The stresses in a section of a body subject to bending shall be computed on the assumption that the elongations are proportional to their distances from the neutral axis and that all the tensile stresses are taken up by the steel reinforcement.

3. Shearing stresses shall be computed, unless the form and design of the members show at once their insignificance. If no allowance is made for them in the design of the member, they must be taken up by suitably shaped steel reinforcement.

4. The reinforcing steel shall so far as possible be so formed that its displacement in the concrete shall be prevented by its form. So far as this is lacking, the adhesive stress shall be computed.

5. Computations for the flexure of columns shall be made if the height exceeds eighteen times the least diameter. Transverse connections, which shall hold the embedded steel rods in their positions relative to each other, shall be placed at distances apart not more than thirty times the diameter of the rods.

6. For the computation of the columns for flexure Euler's formula shall be used.

(d) *Allowable Working Stresses.*—1. In the members subject to bending the compressive stress in the concrete shall not exceed one-fifth of its ultimate resistance; the tensile and compressive stresses in the steel shall not exceed 17,000 lbs. per sq. in.

The following loads shall be provided for:—

1.—(a) For structural parts subject to moderate impact, such as floors of dwellings, offices and warehouses; the actual dead and live loads.

(b) For parts subject to higher impact or widely varying loads, such as floors of assembly-rooms, dancing-halls, factories and storehouses: the actual dead load and one one-half times the live load.

(c) For parts subject to heavy shocks, such

as roofs of vaults under passageways and yards: the actual dead load and twice the live load.

2. In columns the concrete shall not be stressed above one-tenth its breaking strength. In computing the steel reinforcement for column flexure a factor of safety of 5 shall be provided.

3. The shearing stress in the concrete shall not exceed 64 lbs. per sq. in. If greater shearing resistance is shown, the shearing stress shall not exceed one-fifth of the ultimate resistance.

4. The adhesive stresses shall not exceed the allowable shearing stress.

III. Method of Computation.

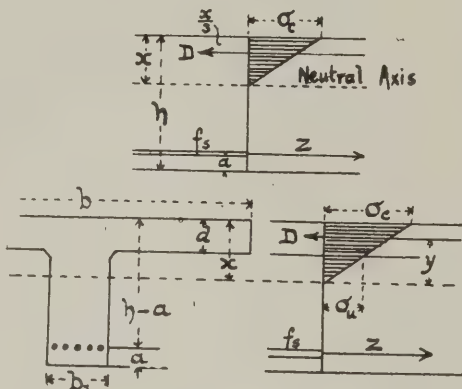
(a) *Simple Bending.*—The beam is reinforced on the tension side only. If f_c denotes the sectional area of the reinforcing steel for a width b of the beam and n the ratio of the co-efficient of elasticity of the steel to that of the concrete, the distance of the neutral axis from the upper surface follows from the equation of the static moments of the areas:—

$$x = \frac{nf_s}{b} \left[\sqrt{1 + \frac{2b(h-a)}{nf_s}} - 1 \right]$$

From the equation of moments the greatest compressive stress in the concrete, c_c , and the greatest tensile stress in the steel, c_s , will be:—

$$c_c = \frac{2M}{b \times \left(h - a - \frac{x}{3} \right)}$$

$$c_s = \frac{M}{f_s \left(h - a - \frac{x}{3} \right)}$$



For tee-formed beams the computation remains the same as the above if the neutral axis lies in the flange or at the junction of flange and web. If the neutral axis passes through the web the slight compressive stresses in the web may be neglected.

The resulting formulæ are:—

$$x = \frac{(h-a)nf_s + \frac{bd^2}{2}}{bd + nf_s};$$

$$y = x - \frac{d}{2} + \frac{d^2}{6(2x-d)};$$

$$c_s = \frac{M}{f_s(h-a-x+y)};$$

$$c_c = c_s \frac{x}{n(h-a-x)}.$$

(b) *Centric Pressure.*—If F be the cross-sectional area of the concrete in compression and f_s that of the total reinforcing steel the allowable load will be:—

$$P = c_c(F + nf_s).$$

The greatest stress in the concrete will be:—

$$c_c = \frac{P}{F + nf_s}.$$

The greatest stress in the steel will be:—

$$c_s = nc_c = \frac{nP}{F + nf_s}.$$

(c) *Eccentric Pressure.*—The computation is the same as for a homogeneous material, except that in the expressions for the cross-sectional area and the moment of inertia of the reinforcing steel n times the value of an equivalent section of concrete is substituted. Any tensile stresses which may be produced must be taken up by reinforcing steel provided for this purpose.

IN PARLIAMENT.

(By our Press Gallery Representative.)

DURING the debate on the Home Office vote on August 4th, Mr. John Burns called special attention to the increase in the number of accidents occurring on buildings. He attributed this largely to the hurry of American methods which were being adopted in this country. It would be interesting, he thought, if the Home Secretary would obtain for the purpose of comparison a return of the number of accidents on the new Savoy Hotel in the Strand, which was constructed on the American system, and a similar return of the accidents during the construction of the works of the new electric installation in south-west London, which were carried out on the English system.

Mr. Weir asked Lord Balcarras if he would state the names of the firms invited to tender for the new ventilating plant required for the better ventilation of the House of Commons, and seeing that the recommendations given by James Keith & Blackman Co. before a Parliamentary Committee had been largely adopted, whether he would say why this firm was not invited to tender.

Lord Balcarras stated that the type of inlet fan selected for the work now in progress was that manufactured by Messrs. Matthews & Yates, of Manchester. Whatever recommendations might have been made by Mr. Keith, they did not govern the question of the exact type of appliances to be used in giving effect to the Committee's independent decisions. The order for the extracting fan had not yet been placed, owing to certain structural difficulties which had arisen. The remainder of the appliances had been designed in the Office of Works, and it was not proposed to apply to manufacturers of specialities in this connection.

Replying to another question by the same member, Lord Balcarras said the type of fan selected for the inlet ventilation of the House of Commons was of the cased blower type, which was largely adopted for mine ventilation. The fan and motor were guaranteed to work without noise. The structural difficulties connected with the extraction concerned building matters only. No application to tender for the extraction fan would be refused.

Mr. Akers Douglas, the Home Secretary, replying to a question by Mr. Claude Hay, stated that no progress had been made with the building of additional quarters for fifty officers at Dartmoor Prison, as no funds were available for the purpose in the present financial year. When the estimates for next year were being prepared the needs of Dartmoor would be considered.

Mr. Henniker Heaton asked the Prime Minister whether, in view of the impossibility of carrying the Port of London Bill, he would now accede to the request of the Corporation of the City of London and the Thames Conservancy Board for a departmental enquiry into the practicability of the Thames barrage scheme, to be carried on during the recess, so that a decision might be arrived at and the views of engineers ascertained before further legislation was undertaken during the next session of Parliament.

Mr. Balfour feared he could only repeat what he had already stated, namely, that there did not appear to be sufficient expert support for the project in question to justify

the enquiry suggested by his honourable friend.

In reply to Mr. Bryce, who asked again what had been done for the protection of the ancient walls of Berwick-on-Tweed, Lord Balcarras stated that the First Commissioner of Works had not yet learnt the result of the negotiations with the town council, but he had no reason to doubt that they would be brought to a successful conclusion.

Mr. Pierpoint asked Lord Balcarras whether his attention had been drawn to the decaying condition of the bas-reliefs on the arches at the entrance of the park at Hyde Park Corner, and whether he would give instructions for their restoration; in reply to which Lord Balcarras said the bas-reliefs had been examined, and the stonework was reported to be in a fair condition, although there were parts somewhat decayed. Experiments were being tried as to the effects of Professor Church's baryta solution on outside Portland stone; when the result was ascertained the First Commissioner would consider its application to these bas-reliefs for the arrest of the decay. There seemed to be nothing requiring urgent attention; and, having regard to the great need for restricting public expenditure at this time, the First Commissioner regretted that he could not promise now to undertake a restoration.

In reply to Mr. H. C. Richards, Lord Balcarras said it was not proposed to remove the statue of King Charles the First from its present position at the top of Whitehall, although it might be necessary to shift it a few feet in connection with street alterations. Mr. Richards made reference also to restoring "the statue of King James the First to its original position," which Lord Balcarras failed to understand. He said: "If the statue of James the Second lately placed at the west front of the new Admiralty is that alluded to, the First Commissioner has no intention of removing it from its present site, which is, he thinks, generally regarded as an appropriate one."

Other enquiries evoked the following replies:—That the improvement of the lighting in Old Palace Yard will receive consideration in next year's Estimates; and that, pending the result of further investigations, it is impossible to say when the final report of the Royal Commission on Sewage Disposal will be published.

THE BUILDING TRADE IN SOUTH AFRICA.

Present Outlook: Opportunities for British Firms.

FROM time to time during the past year or two we have published reports of the condition of the building trade in South Africa. Thus, in our issue for May 20th, 1903, we gave some particulars of works in Johannesburg, together with the current prices of building materials; in our issue for July 1st, 1903, some information about the opportunities for workmen and the condition of their employment; in our issue for July 29th, 1903, particulars of the building trade in Port Elizabeth; and in our issue for October 21st, 1903, some facts about future trade and the chances of British manufacturers securing it.

For a statement of the present outlook we are indebted to "South Africa." Our contemporary points out that just now the building industry in South Africa presents, superficially at least, a very misleading aspect, the openings which an enormous and remunerative trade will present being too much overshadowed by what the best opinion obtainable pronounces as but a partial and temporary depression. "No doubt the development in the building industry is as

assured as the development of the mining industry itself. It is, however, far from being so concentrated, and the demand being a scattered one reports are often contradictory. Moreover, while judging different localities separately on their individual merits the result is often disappointing. If the aggregate amount of work is considered—and only from this standpoint can manufacturers form a fair estimate of the industry—an enormous amount of trade is at once apparent, even in the dull period the industry has just passed through. At the same time a good idea is obtained of future prospects. . . . In the building industry, as in so many others, Johannesburg represents a centre upon which manufacturers and others may profitably concentrate attention. Here new buildings are going up at the rate of a million and three-quarters sterling per annum. During the first quarter of the present year the value of the buildings for which plans were approved was £453,433; whilst for the second quarter they totalled £418,275, or £871,708 for the half-year ended June 30th. Last year, however, the earlier months of which represented something of a boom in the building trade, plans of new buildings passed monthly represented anything between £200,000 and £400,000, a figure likely to be touched again in the more prosperous times approaching.

Demand for Small Dwelling-Houses.

"The figures given for Johannesburg apply proportionately to many other centres in South Africa. Here, again, the prospects of future development are no less assured, if on a smaller scale. The information obtained by reports to hand is rendered as useful as it is encouraging when the buildings erected are classified and an attempt made by this means to gauge the nature of the demand and the material and manufactures mostly suited to the requirements of the country. Almost at the first glance we see a tendency for erections of less imposing design and more modest dimensions; for while the number of plans passed often shows an increase, the value of buildings in question remains stationary or decreases in amount. Indeed, the number of small buildings or rooms required is a point which the British manufacturer cannot ignore, for by his cheaply and efficiently catering for this special work a remunerative trade should accrue. . . . It represents a section of the demand which should be readily met by imported structures and materials, and as such is well worth the attention of home firms. The large number of sheds, stables, stores and workshops included in the total likewise convey a very similar moral to the enterprising manufacturer.

A Chance for Steel Firms.

"In most cities in South Africa, hotels, public buildings and sacred edifices are required, and many have long since been under consideration, awaiting but a propitious moment to be brought to fruition. The question of constructional iron and steel enters very much into such considerations, and in this direction large and remunerative markets are likely to be opened up. In certain parts of Johannesburg, Cape Town, Durban and other leading South African centres land is as dear as in the heart of London. For such, buildings of great height are an economic necessity, and the employment of structural iron and steel is proportionately as general as in London or New York. The building industry in South Africa is exceptionally favourable for such material, the merits of which are more widely recognized and are likely to be more extensively utilized than in any other county in the world. But the building trade has many side issues which British manufacturers will do well to heed. For them its merits consist not only in supplying the material or in other ways directly contributing towards

the edifice, but also in aiding the industry to cater for its own requirements and to manufacture its own supplies and materials. The brick-making industry at Cape Town, with its demand for plant and machinery, is a case in point—a side issue in the building trade from which home manufacturers should not be slow to profit. There are many such, and thus both directly and indirectly the development of the building industry in South Africa should represent an enhanced volume of trade both in this country and in the sub-continent. In the past the industry has been seen at its worst, but even the modest volume of building then inaugurated is evidence of profound faith in the future. A brighter prospect is already dawning and merits at once the zealous enterprise of home manufacturers."

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

The Irish Board of Works.

NEWPORT, MON.—A. H. D. writes: "What is the address of the Irish Board of Works and where can I get information about appointments therein?"

Write to Mr. H. Williams, secretary, Office of Public Works, Dublin.

Books on Illuminating, and Inns of Essex.

BIRMINGHAM.—ASTONIAN writes: "I wish to take up illuminated address work and should be glad if you could give me the title of any work on this subject."

We are not aware of any modern book on the preparation of illuminated addresses. The best text-book on the art of illuminating is that by Tymms & Wyatt, a second-hand copy of which would cost about 9s. 6d. Mr. B. T. Batsford, 94, High Holborn, London, generally has copies.

LONDON.—R. S. writes: "Where could I get a book dealing with the inns of Essex, notably the old 'Spotted Dog' of Upton?"

For information concerning the old inns of Essex we think the best source would be such works as Tristram's "Coaching Days" (Macmillan, 2s. nett), C. G. Harper's "The Norwich Road" (Chapman, 16s.), the various guide-books and county histories.

Roof for Concert Hall.

WEST COUNTRY writes: "I should be glad if one of your experts would state, from actual experience, what is the best form of roof for a concert hall. The hall in question is to be about 130ft. long and 50ft. wide, and has to be built as economically as possible. At present it is intended to cover it with a flat pitch (30 degs.) roof, on ordinary iron principals, open to the apex, but possibly a modification of this would improve the acoustic properties. Similarly the proportions of the hall can be amended if required. I am informed that a barrel-roof is the best form. If so, would not a flat pitch and collar-beam roof give practically the same result? A choir of 500 voices, with the necessary orchestra, has to be accommodated, for whom it is proposed to provide a platform 2ft. 6in. high and a rising gallery in 6in. tiers."

Mr. James Miller, F.R.I.B.A., the well-known Glasgow architect, who designed the large round concert hall at the Glasgow Exhibition, has been good enough to send the following reply to the above enquiry:—The hall in question seems to be too long for its width, namely, 130ft. by 50ft. I would suggest that a better proportion for acoustics

would be 100ft. by 50ft. or 110ft. by 55ft. On such a building I find an elliptical roof gives excellent acoustic results, and this can be readily constructed by means of steel principals, covering the under-side of them with fibrous plaster. In order to get the same result with a flat pitch and collar-beam roof it would be necessary to make the building considerably higher than is necessary with an elliptical roof. The platform suggested for the choir is too low at 2ft. 6in. It would be better to have the rising tiers more than 6in. in height.

Builders' Insurance against Compensation.

KINGSTON-ON-THAMES.—G. H. W. writes: "In covering risks under the Compensation Act do insurance companies limit the amount of any one claim under the 'public liability' section, and if so what is the usual amount of such limit?"

Accidents to the public do not come under the Liability Acts, but any person injured under certain conditions can recover at common law. All insurance companies place a limit on this risk, as an action would be simply brought for damages which would be calculated by the Court, and would range from the respective position of a crossing sweeper or a duke.

Buildings to Measure in South Wales.

SWANSEA.—ASSISTANT writes: "What buildings in South Wales are suitable to measure for the R.I.B.A. intermediate examination—some in which I can find mediæval ornament for the sheet of ornament?"

Surely "Assistant," who resides in the district about which he enquires, must be better able to obtain the information he desires than we can be. He might, too, make enquiries of the hon. secretary of the Cardiff, South Wales and Monmouthshire Architects' Society; but pending receipt of an answer should visit Neath and Margam Abbeys and possibly Ewenny, while Tintern is not far beyond the border.

G. A. T. M.

Bankruptcies.

[Abbreviations R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending August 12th twenty-three failures in the building and timber trades in England and Wales were gazetted.

E. JONES, builder, Nunhead. Adj. Aug. 5th.

J. BERRY, builder, Llandudno. Adj. Aug. 4th.

E. SALTMARSH, builder, Chelmsford. R.O. Aug. 5th.

F. J. WHUR, builder, Southend-on-Sea. R.O. Aug. 3rd.

F. BEAVIS, builder, Sonning Common. Adj. July 30th.

A. W. CADWALLADER, builder, Cardiff. R.O. Aug. 3rd.

F. ROBINS, builder, Farnham. P.E., Town Hall, Guildford, Oct. 4th, at 1. Adj. July 30th.

RAWLINS BROS., painters and decorators, Sheffield. P.E., Sheffield C.C., Aug. 25th, at 2.

T. WILLIAMSON, plumber and zinc worker, West Birmingham. Adj. July 28th.

DAVIES, HARRISON & HOWGATE, builders, Osmondthorpe. Gross liabilities £11,837; estimated surplus £2,703.

A. BROWN, builder and contractor, Harrogate. R.O. Aug. 5th. First meeting, O.R.'s, York, Aug. 19th, at 12.30. P.E., Courts of Justice, York, Oct. 7th, at 11.

N. L. JOHNSON, builder, Twyford. R.O. Aug. 5th. First meeting, O.R.'s, Southampton, Aug. 17th, at 4.30. P.E., The Castle, Winchester, Oct. 10th, at 11.

W. G. SHARP, painter and decorator, South Shields. R.O. Aug. 3rd. P.E., Newcastle-on-Tyne C.C., Aug. 18th, at 11.

T. HUGHES, painter and decorator, Aberystwyth. P.E., Town Hall, Aberystwyth, Aug. 19th, at 10.30. First meeting, same, at 11.

H. R. DOBBS, builder, Bristol. No statement of affairs lodged. Debts due to mortgagees £7,573, the properties being chiefly on the New Clifton estate. There is a probability of a small surplus being realized.

W. H. FURNIVAL, builder, Wolverhampton. First meeting, O.R.'s, Wolverhampton, Aug. 18th, at 11.30. P.E., Wolverhampton C.C., Aug. 24th, at 11. Gross liabilities £5,148; £303 2s. 4d. to rank for dividend; deficiency £473.

Keystones.

Mr. Aston Webb hung the architectural drawings at this year's Academy.

Earl's Court Exhibition next year will be "naval, shipping and fisheries," the Austrian exhibition having been postponed till 1906.

A new British Hospital in Rome is being erected on the Coelian Hill. The foundations have just been commenced.

Mr. George Frampton, R.A., is busily at work on the first design for his colossal bronze statue of the late Marquis of Salisbury, to be erected by the county of Hertford.

Cardiff new Town Hall: Woodwork Contract for Assize Courts.—The Cardiff Town Hall Committee have accepted the tender of Mr. John P. White, of Bedford (£3,135), for the whole of the woodwork, fittings, &c., in connection with the two assize courts, subject to its being reduced to £3,000.

Junior Institution of Engineers.—The summer meeting of the Institution this year is to be held in Germany, Dusseldorf being the first stopping-place, on Saturday, August 13th. The return journey will be made on August 27th, and will include the Rhine from Brebrich to Bonn.

New Trade Union Offices in Manchester.—The Friendly Society of Ironfounders, which is to move its headquarters from London to Manchester, has secured a site in Chorlton Road, Brook's Bar, on which to build new offices. Messrs. T. Cook & Sons, of Manchester, have been appointed architects.

Memorial Tablets have been placed by the London County Council on No. 1, Devonshire Terrace, Marylebone Road, where Charles Dickens resided from 1839 to 1851; on No. 67, Wimpole Street, W., where Henry Hallam lived from 1819 to 1840; and on No. 22, Theobald's Road, where Lord Beaconsfield was born.

Peterborough Cathedral Restoration.—The further work of restoring Peterborough Cathedral has commenced. A gradual subsidence caused some dangerous cracks at the east end to develop, and extensive underpinning will be necessary. The cathedral has been under constant repair for the past twenty years, and more than £80,000 has been spent on the fabric.

Visit of French Archæologists.—Members of various French scientific societies, principally archæologists, to the number of 140, visited Scarborough on Tuesday last week. This was their first port of call in a tour they are making of the British Isles, during which they will visit Scotland and the Orkneys, North Wales and Dublin, returning to Boulogne on August 24th.

Waltham Abbey Tower Restoration.—After long and bitter dissension all opposition to the proposed restoration of Waltham Abbey Tower has been overcome and the work commenced. The design adopted is that of Mr. J. A. Reeve. The Government is to be asked to subscribe towards the cost (£2,100), on the ground that they are large landowners and employers of labour in the parish.

The new Gaiety Theatre at Ayr has been reconstructed in accordance with plans prepared by Mr. Alex. Cullen, F.R.I.B.A., of Hamilton. The former theatre was partly destroyed by fire last year. The building has been heightened 11ft., and eight boxes now take the place of the original four. An amphitheatre has been introduced, the entrances and exits have been improved, so that there are two exits from each part of the house. The entire auditorium has been remodelled, and the galleries taken down and re-erected with steel and concrete. The roof also has been renewed and the stage improved.

New Library for Tipton.—The design for this building by Mr. John Perry, of Tipton, has been adopted by the district council. The cost is estimated at £3,305.

The Wesleyan Chapel at Ely has been extensively altered and renovated by Mr. Walter Feast, architect and builder, of Haddenham.

An Index to the Iron and Steel Report of the Tariff Commission has just been issued from the offices, 7, Victoria Street, Westminster.

The Hotel Metropole at Southend-on-Sea, overlooking the pier, has been furnished largely by Messrs. Oetzmann & Co., of 62-79, Hampstead Road, W.

"Specialism in Architecture" is the subject of a paper to be read on October 7th at a meeting at the County Hotel, Newcastle-on-Tyne, on the occasion of the R.I.B.A. visit.

Mr. Henry Pegram, A.R.A., has been commissioned for the statue of Sir Thomas Browne, the famous physician and man of letters of the sixteenth century, which is to be erected at Norwich.

The Residence of Mr. Haldane, K.C., M.P.—"Cloan," near Auchtermarder—is being extended from designs by Mr. H. Ramsay Taylor, of Messrs. Lessells & Taylor, architects, Edinburgh.

"Builders' Journals" Wanted.—The following issues (out of print) are wanted:—1901: October 2nd. 1902: February 26th, June 11th, August 13th and 20th, September 10th, November 12th and December 31st. 1903: February 18th and December 16th.

A new Hotel at Ryton, Newcastle, has been built at the junction of the Carlisle Road and Whitewell Lane End from designs by Messrs. W. & T. R. Milburn, F.R.I.B.A., architects, of Sunderland. Mr. R. M. Storey, of West Boldon, was the builder.

A new Book on "The Furniture Styles" will be published shortly at 5s. nett. The author is Mr. Herbert E. Binstead, editor of the "Furniture Record," and all the principal styles are dealt with, from the Elizabethan to "L'Art Nouveau."

A 26-Storey Skyscraper is to be erected in Wall Street, New York. The top floor will be 346ft. from the ground. The highest building at present in New York is the Park Row building, the roof of which, excluding its towers, is 309ft. above the kerb.

School of Architecture, University College, London.—A new syllabus of the architectural classes at this school (which is under the direction of Prof. F. M. Simpson) has just been issued. The next session commences on Tuesday, October 4th. The school has lately been remodelled and its curriculum is an excellent one.

A Paris Rowton House.—The Assistance Publique has accepted the project of M. Longerey, a Paris architect, for the construction of an immense establishment on the "Rowton House" model, and the site of the old prison of La Roquette has been allotted for the purpose. There will be 840 cubicles, divided into fifty-five sections, so as to provide for isolation in case of epidemics. Each room will be let at 6d. a day.

A Scaffolding around the Bell Harry Tower of Canterbury Cathedral has been erected with a view to a thorough examination of the condition of the fabric. The Dean of Canterbury states that no fears are entertained as to it being structurally unsound, but that the ornamentations of the windows are in some danger. The need of some measure of restoration is evident, but the Dean and Chapter are awaiting the report of their architect, Mr. W. D. Caröe, on the subject. The scaffolding is a very elaborate work and its erection has cost about £1,000.

Bricks and Mortar.

Aphorism for the Week.

*As when a lofty pile is raised
We never hear the workmen praised
Who bring the lime and place the stones,
But all admire Inigo Jones.*—SWIFT.

Our Plates.

"THE DIAL HOUSE" at Shortfield Common, Farnham, was originally a small farmhouse with hop-kiln attached. Apparently built about forty years ago, it was a collection of inconvenient rooms and storage places. The problem was to convert it into a house suitable for an artist at a very reasonable outlay. Unfortunately it was not possible to retain the hop-kiln as a feature of the new house, but considerable advantage has been taken of the difference in level between the hall and the gallery. The present roof is tiled, the house being whitewashed except where the old walls are of stone; there was no alteration to any outside wall, so that the ivy and other plants remain on the walls. The house has been entirely rearranged by Messrs. Niven, Wigglesworth & Falkner, of London and Farnham, to whom the present plan is due. The builder was Mr. W. Deadman, of Churt, Farnham.—The site of the proposed house at Hindhead overlooks the

of a large grass roof supported by a forest of poles. The cathedral is the work of Mr. Borup, the engineer missionary who has taught the Baganda to make bricks, has instructed young men in carpentry and other handicrafts, and has superintended their first building operation on a large scale. The walls and two rows of massive columns are built of sun-dried bricks, while those used for the foundations have been burnt in a kiln. The roof, neatly thatched with the long native grass, rises over the transepts into three peaks, to describe which, says the "Times" correspondent, "I know of no word in the phraseology of European architecture." The most remarkable features in the building, however, are the beautifully executed reed-work which covers the ceiling and the palm stems that serve as beams and rafters.

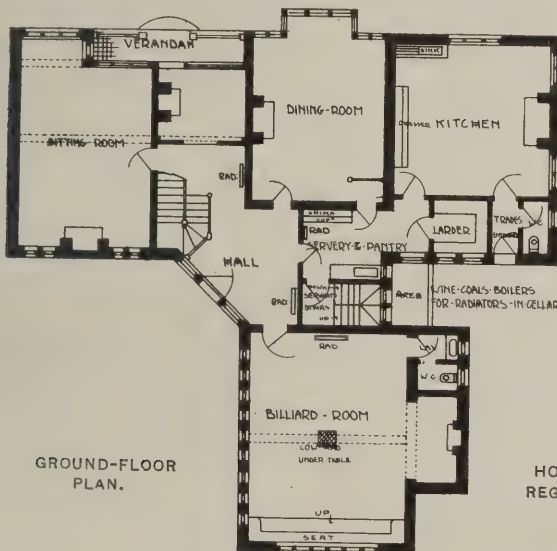
Watts's Statue of Tennyson.

ONE of the last great works of the late G. F. Watts, R.A., was a statue of his friend, Lord Tennyson, and it is a somewhat pathetic fact that though this was completed several months before his death, up to the present the powers that be have not agreed upon a site. Mr. Watts is said to have expressed a wish that the statue should be erected somewhere within the close

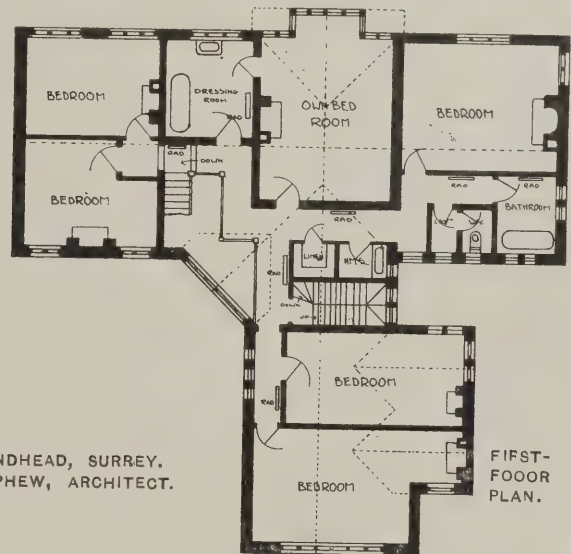
placed near the cathedral. The committee have gone so far as to have a dummy model of the statue made and erected on the various sites suggested.

The Chantry Bequest.

THE report of the Select Committee of the House of Lords appointed to enquire into the administration of the Chantry Trust recommends some sweeping changes, amply justifying the claims for reform made by critics. The Committee propose (1) to take away the power of purchase from the President and Council of the Royal Academy; (2) to vest it in a committee of three, consisting of the President, an R.A. nominated by the Council, and an A.R.A. nominated by the body of Associates. Moreover, they advise the Academy to invite the other chief artistic societies in England and Scotland to send in regular reports to the committee of three with regard to important works that might be purchased; and they would break down the self-imposed limitations as to methods of purchase, making it possible to buy not only from the exhibitions but from studios, from private owners, from sales and even from dealers. A detail of some importance is the recommendation that greater elasticity should be given to the provision of the will as to works of sculpture.



GROUND-FLOOR PLAN.



HOUSE AT HINDHEAD, SURREY.
REGINALD MORPHEW, ARCHITECT.

FIRST-FLOOR PLAN.

the Devil's Punch Bowl and miles of country beyond, and is, perhaps, one of the most beautiful in Surrey. The building has not yet been carried out. The outside timber-work (of an average thickness of 6in.) is to be of pine treated with Jodelite, the timbers being pinned together with oak pins. The walls and backings are to be of bricks, faced with white plaster. The sitting-room, dining-room, billiard-room and hall are to be panelled in oak, and the ceilings, in which the joists and beams show, are to be of pitch-pine stained a dark oak colour and left flat. Mr. Reginald Morpew is the architect.—The memorial library to the late Mr. F. C. Penrose is, we believe, now being erected. It forms an addition to the Macmillan Hostel or students' house built five years ago in the grounds of the British School at Athens. The original school building, now the director's house, was designed by Mr. Penrose. As he was the first director and did so much for the school the present library addition forms a most fitting and useful memorial. Mr. Heaton Comyn, A.R.I.B.A., is the architect.

Uganda Cathedral.

THE cathedral of Uganda, recently consecrated by Bishop Tucker, must be a rather strange building. It stands on the top of a hill and replaces a building which consisted

of Lincoln Cathedral, and, in spite of protests of the local public, a position was chosen on the south-east corner of the Minster Green. The majority of the citizens were strongly in favour of another site in the centre of the city. But this protest was ignored. Now, however, protestation has broken out afresh, and a petition was being signed last week asking the committee (of which Earl Brownlow is chairman) to reconsider its decision. The petitioners contend that the statue will be quite out of harmony with, and will entirely destroy the noble and world-renowned view of the cathedral from the south-east, which is usually the first view of the building beheld by visitors. An alternative site is suggested. Amongst those who have signed the petition are the Bishop of the diocese, the Precentor, the Archdeacon, the Sub-Dean, the Right Hon. H. Chaplin, M.P., and Mr. Hodgson Fowler, the architect to the Dean and Chapter. The site on the south-east is already staked out for the reception of the statue, which is of heroic proportions, and stands, with pedestal, about 20ft. high. It is said to be a remarkable piece of work, and it is declared that it will take its place in the world of art as one of the finest pieces of contemporary sculpture. Some subscribers have declared their intention of withholding their contributions should the statue be

A Place for Thin Men.

PROBABLY the narrowest shops in London are now being fitted up in Fleet Street on each side of the archway which leads to the Old Bell. When the City Corporation and the L.C.C. commenced the widening of the eastern end of Fleet Street seven years ago about 16ft. was cut off the building on this site. It did not run so far back as some of its neighbours, with the result that when the slice was cut off the remainder was very shallow in depth. As the Corporation did not desire that the Old Bell should extend its frontage to Fleet Street, probably because it would be able to claim large compensation if there were another widening, the site has ever since remained vacant. An enterprising lessee has now erected a building which provides two shops. Their interior depth cannot be more than 4ft., and apparently a window case will have to come out of that. So urgent is the need for economizing space that access to the upper floor is provided by a very narrow circular iron staircase.

Mr. Goscombe John, A.R.A., has been commissioned to execute a tablet and bust of the late Alderman and ex-Mayor Thomas Jones, of Newport, Mon., to be placed in Newport Town Hall, with a replica in the sanatorium.

Views and Reviews.

A new Proposal in regard to the Metric System.

Our several systems of coinage and weights and measures have long provided subjects for discussion by Royal Commissions, Select Committees, and both Houses of Parliament, but that we shall ever have a metric system in place of them seems very doubtful. Decimal coinage may come, but an adaptation of our present system to a modified decimal form is the only thing which seems practicable, though such an adaptation would forego the principal benefit to be derived from the introduction of the metric system, *i.e.*, universal standards. There would still be the same trouble of converting from the French metric system to the English, &c.

The author of the work under notice has originated a very practicable scheme of making ours a decimal coinage. His idea is to introduce two new coins, namely, a silver coin worth 10d. called an arg and a gold coin worth 100d. called a norm, the penny remaining our standard coin. He thinks that arithmetical calculation in norms and args will be so simple that, though for a time it will run concurrently with our present system, it will eventually supersede it and a decimal coinage will be an accomplished fact with us.

His system, however, is not without its defects. Besides the trouble of converting which we have already mentioned, it presents other difficulties. Firstly the arg is so near in value and size to the shilling, and the norm to the half sovereign, that misunderstandings—to say the least—would sure to be plentiful. In the end the *rs.* may drop out, but the difficulty with the half sovereign will remain. Again, while the two systems of reckoning were in use concurrently much confusion would arise between business houses, some reckoning in the new way and others in the old. The norm also is much too small a standard for bookkeeping purposes. Firms whose financial dealings run into four, five, six or even seven figures would find it altogether insufficient. It is difficult enough to comprehend £1,000,000, but 2,400,000 norms is worse than incomprehensible. Before Mr. Anthony's scheme could be adopted further elaboration would be necessary. But as a lucid and clear presentation of the systems and the arguments *pro* and *con* we can recommend the book. The author is evidently in favour of the change, though this does not prevent him giving the other side a fair hearing.

Whilst referring to this matter it is opportune to note that an association, to be known as the British Weights and Measures Association, has been formed with the object of defending, standardizing and simplifying British weights and measures.

"An Enquiry into and an Explanation of Decimal Coinage and the Metric System of Weights and Measures" by Edwyn Anthony, M.A., J.P., barrister-at-law. London: George Routledge & Sons, Ltd., Broadway House, Ludgate Hill, price 2s. 6d. nett.

A New Edition of Ruskin.

A new, complete and authorized library edition of the works of John Ruskin, edited, with additions, from the original manuscripts, by Mr. E. T. Cook and Mr. Alex. Wedderburn, is now being published by Mr. George Allen, 156, Charing Cross Road, W.C. In all, there will be about thirty-two volumes (9½ by 6½) bound in Holliston cloth, with uncut edges. The price is 21s. per volume and orders will only be accepted for complete sets. The price to new subscribers will be raised to 25s. per volume after January 1st, 1905. The text throughout is that which was last revised by the author; but in footnotes and appendices passages from the MSS. are given of variations noted. Each of the volumes contains some new matter and each is prefaced by an introduction which is at once biblio-

graphical and biographical. In the compilation of these prefaces Ruskin's diaries and correspondence have been largely used. Every illustration hitherto published will be included. In addition, a large number of unpublished drawings will be given, as well as numerous unpublished plates already engraved under the author's personal supervision. Some of the best portraits of Mr. Ruskin are inserted as frontispieces, and facsimiles of the MSS. are also given. The paper is a special make of unbleached Arnold, and bears the watermark of Mr. Ruskin's seal and monogram. A complete prospectus will be sent, post free, on application to Mr. Allen.

Among the volumes now ready are "Modern Painters," "The Stones of Venice," "Lectures on Architecture and Painting" and "The Works of Turner." Mr. Allen is also issuing a half-crown edition of Ruskin, already noticed in these columns.

WATER-SUPPLY BY HYDRAULIC RAMS.

By G. S. MITCHELL, F.S.I.

THOUGH the hydraulic ram has been used for the purposes of water-supply for many years, the simple principles upon which its action depend seem to be very little understood and, indeed, appear by many people to be considered obscure.

One often hears an exclamation from a visitor viewing a ram in action, "What a great deal of water it wastes compared to what it delivers!" but the looker-on forgets that the water thus apparently "wasted" has been deprived of its energy, and though it is not pumped up so as to afford supply it has yet furnished the power by which a due proportion of the water has been forced to a higher level.

Where suitable conditions exist, a ram forms an especially valuable means of water-supply for household, garden or agricultural purposes, as it is extremely cheap in its first cost, requires little fixing, occupies but a small space, costs practically nothing for maintenance, needs no oiling, and necessitates a minimum of superintendence. It can hardly get out of order, on account of the great simplicity of its parts, and one can only wonder that its use is not more general.

The range within which a ram may be employed, both as regards the volume of water and the fall necessary to work it, is very considerable. I have myself a 1in. ram working with a total supply of less than a gallon per minute, and giving no trouble whatever. From 5ft. to 25ft. are the falls within which a ram may be most advantageously installed, as, though it is possible to make them work with greater or less falls than these, they are not so efficient as is the case within those limits.

Varieties.

The "simple" or "direct-acting" ram raises a portion of the water from the momentum of which it derives its power, and is most useful when the water is abundantly more than the supply required for use. The "compound" ram is much more costly and may be fixed in such a way that, while drawing its power from an impure source, it pumps a pure supply up the rising main from another source.

As more generally useful, I propose to confine my remarks to the "simple" variety.

Power.

The power depends on (1) the vertical fall (measured on the injection pipe)—being the distance between the surface of the source of supply and the position of the ram; (2) the quantity of "drive" or "power" water available; and (3) the vertical lift (*i.e.* the height of the point to which it delivers).

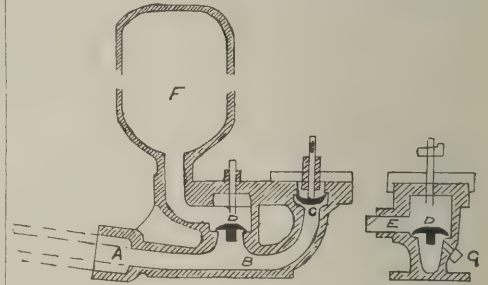
The rule stated in "Molesworth" that one-seventh the water can be continuously raised

to four times the height, one-fourteenth to eight times, and so on, has been proved by the writer to be a very reliable guide as to what an ordinary ram may be expected to perform.

To calculate the quantity of water a ram will raise it is necessary to multiply the number of gallons per minute available by the height in feet through which the water falls before it acts on the valves, and by '65 (to allow for loss by friction, &c.); then to divide the product by the height in feet to which the water has to be raised. The result will be the number of gallons which the ram will deliver per minute.

Description of a Ram.

The machine consists of an inclined "injection" or "drive" pipe A, through which



the water passes from its place of collection into a confined pipe or "chamber" B, which terminates in a "pulse valve" C, opening inwards. At an intermediate point in the chamber B the connection to the rising main branches off; a valve D, opening outwards, being placed on this branch immediately below the entrance to the rising main or "delivery pipe" E. An air vessel F, which should theoretically be equal in content to that of the delivery pipe, and a "sniff valve" G, complete the arrangement.

The sizes of ram usually employed range from 1in. to 4in. in diameter; if made larger than the latter size they do not work well. When more water is required than one ram will supply, two or more may be coupled to pump into the same delivery pipe. When the fall is great it is usually better to thus fix two rams, the waste from the first forming the motive power of the second.

The cost of a ram ranges from about £4 10s. for one of 1in. diameter to £35 for one of 4in. Perhaps the 2in. size is most generally useful.

Action.

The action of a ram is as follows:—The supply of water passing down the drive pipe with a momentum occasioned by its fall, discharges through the pulse valve C until (as happens almost instantly) that valve closes. A recoil then takes place which forces open the valve (usually of the kind known as "mushroom") D. This relieves the pressure by allowing a portion of the flowing water to enter the delivery pipe. Equilibrium being thus restored, the pulse valve C falls and water again passes to waste.

This process is repeated several times per minute, and its incidence can be regulated to some extent by the length of stroke which may be given to the pulse valve. The spindle of this valve is shown in the sketch as furnished with a cotter adjustment, and the stroke is regulated by the addition or subtraction of washers, but personally I prefer that the adjustment should be made by a couple of nuts travelling upon a screw cut upon the spindle for the purpose; the wear and tear occasioned by this arrangement is infinitely less than that which takes place with the cotter and washers.

The necessity for adjustment consists in the fact that, to obtain the greatest efficiency from the ram, the stroke of the pulse valve must be fixed in accordance with the quantity of water passing at the time, and

by thus quickening or retarding the stroke any variation in the volume of water may be dealt with. The less the quantity of water, the shorter and quicker the stroke should be.

To start a ram one must at first press down the pulse valve—at proper intervals—until a sufficient working pressure is acquired in the air-vessel to secure the necessary sharp recoil for continuous working.

The use of the very small "sniff" valve *G* is to recharge the air-vessel *F* as its atmospheric contents become absorbed by the passing water.

Should the ram be fixed in so low a situation as to cause temporary submergence, it will nevertheless continue to work until the air in the air vessel becomes exhausted.

Sources of Supply.

A ram may be fixed so as to take its supply from a river, lake or pond, from a spring, or even from the collected effluents of land drains.

Should the source be such that a supply cannot be furnished for the whole twenty-four hours, a reservoir may be constructed and an arrangement made by which the ram will work for such a period of each day as the supply suffices. By a simple arrangement of floats the ram may be started automatically, and it will naturally cease working when the level of the feed-water is sufficiently reduced.

Such a reservoir should be covered in, both to prevent contamination and to avoid the growth of *confervæ*—which need light for their development.

Should the water be impregnated with mud or other impurities, a simple gravel filter may be constructed at the intake, but it should be remembered that a filter at the upper end of the delivery pipe would have much less water to purify and might be made much smaller.

In any case, it is well to put a strainer at the inlet of the drive pipe, so that floating timber, weeds, frogs, eels, &c., may not enter—the provision of a filter at the other end then becomes a matter of the purity of the water or the uses to which it is devoted.

Various Arrangements of Construction.

The circumstances of almost every case vary, but generally speaking the arrangements will be found to adapt themselves to one or other of the methods I will now describe.

(1) See Fig. 1. The simplest arrangement consists of a feed from a pond or other reservoir (*a*), from which the water passes through a strainer (*b*) to the drive pipe (*c*), and so through the ram (*d*), the waste discharging through the pulse valve (*e*) and the supply pressing up the delivery pipe (*f*).

The ram may be bolted on to a hardwood block let into the ground at the bottom of the ditch which takes the waste water, or it may be secured from frost or other injury in a brick pit with concrete bottom and locked cover.

(2) See Fig. 2. A more perfect arrangement consists of a watertight reservoir or feed tank into which the water is led by a pipe, and from which the "power water" is taken by the drive pipe in the same way as described in the first case.

The ram is enclosed in a brick pit, from which the waste water is conducted by a relief drain composed of earthenware pipes.

(3) See Fig. 3. Where the lie of the ground requires it, the water must sometimes be taken by a lead of more or less length to the feed tank, and it may be necessary to fix the ram at the bottom of a deep pit as shown in the sketch. If the lead—as is shown—be under more than a trifling pressure it must be composed of iron pipes. The feed tank is carried up in cement brickwork to a few inches above the original water level of the source of supply, in order that an overflow may not take place and that the full effect of the head may be realized.

In the circumstances of course the relief drain becomes a rather expensive piece of work, especially if the ground requires close timbering. It should be iron or in earthenware pipes with cement joints.

Access to the ram chamber is made by a lifting lid, or, as such a pit should be at least 4ft. square inside, a double cover, made folding, is more convenient. Iron steps as in the case of the manhole of a sewer should be

built into the brickwork, being placed near a corner and alternately in either wall, as this arrangement gives more room for one to descend than if they be placed vertically.

The mouth of the waste drain should be bricked up and furnished with a grate to prevent the ingress of vermin.

Description of the Various Portions of an Installation.

"Drive" or "injection" pipe. — This should be of cast-iron with spigot-faucet joints in blue lead. The cost varies from about 6d. per ft. for 2in. to 1s. 7d. per ft. for 6in. pipes. It should be laid at an even inclination, with no bends either horizontally or vertically. Its inside diameter should be in accordance with that of the ram and its length should be equal to at least three-quarters of the vertical height of the lift; the less the fall the longer the drive pipe should be. The usual length is about 60ft.

The strainer and inlet valve may be simply a cast-iron box pierced with holes and secured by a lead joint to the uppermost socket of the drive pipe; it should have a flap or valve opening outwards and capable of being closed when it is desired to shut off the feed to the ram for repairs or other purposes. A short length of chain hooked on to a nail in the wall or cover of the feed tank will keep it open at other times.

A better strainer is, however, made of copper gauze (tinned copper gauze if desired) rolled into cylindrical shape, and secured to the inlet pipe by clamps. Care should be taken that this strainer is of ample capacity, as should it get slightly stopped by weeds, &c., it will tend to cripple the supply of feed water to the ram.

The "feed tank," "catchpit" or "screening chamber," as it is variously termed, is most economically built of 14in. brickwork in cement, resting on a cement-concrete foundation and having its interior face rendered in cement. It should be about 4ft. by 4ft. internal dimensions.

The bottom of this chamber should be 1ft. 6in. or 2ft. below the level of the inlet to the drive pipe in order that any accumulated detritus may fall to the bottom and remain there until the periodical cleaning takes place.

A wooden frame and lid—which latter should be pierced with holes for ventilation and tarred inside—complete this portion.

It is well to lay the cover a little out of the horizontal, so that rainwater may not lie and rot the woodwork.

The ram chamber may be built of 9in. or 14in. brickwork and need not necessarily be watertight. The bottom should be of cement-concrete and may be dish towards the outlet drain. The holding-down bolts for the ram should be securely fixed in the concrete, their exact position being easily determined by the use of a simple template. Where cheaply obtainable, a large flagstone would form an admirable base for the ram chamber.

"Delivery pipe" or "rising main."—This is usually of galvanized iron—"water tube" or "steam" strength—with screw and socket joints. Cost, 3d. per ft. for $\frac{3}{4}$ in. or 6d. per ft. for 1 $\frac{1}{2}$ in.

It should be laid in straight lines with as even an inclination as the circumstances permit, and where curves are necessary they should be as easy as possible.

The delivery pipe should be furnished with a stop-cock close to the ram, and its upper end must be open. When more than one point has to be supplied and at varying levels, the lower points of discharge should have ball-cocks, but in no case must the discharge at the highest level be otherwise than open.

The internal diameter of the delivery pipe should be about one-half that of the drive pipe, though this rule requires a little modification in rams of the larger sizes.

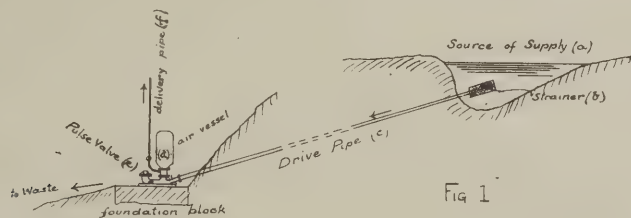


Fig 1

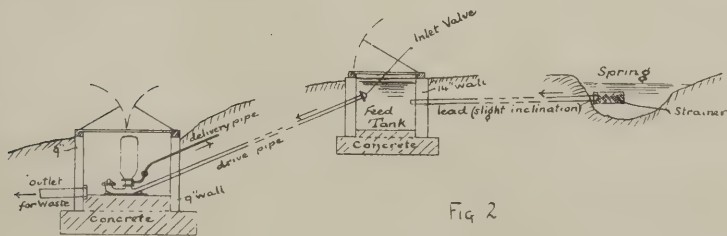


Fig 2

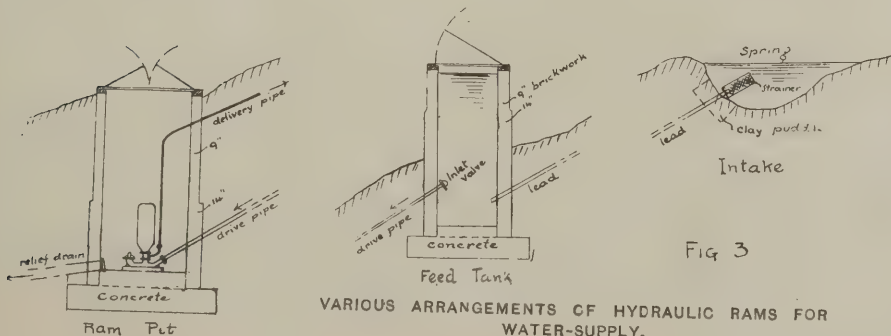


Fig 3

VARIOUS ARRANGEMENTS OF HYDRAULIC RAMS FOR WATER-SUPPLY.

Builders' Notes.

Isolation Hospital for Cheshire.—The tender of Messrs. Birchall, Middlewich, amounting to £6,540, has been accepted for the erection of this building.

Dock Extensions in Liverpool.—On Thursday last the Mersey Docks and Harbour Board decided to spend £222,000 upon an extension of the Brunswick Dock and the provision of single-storey sheds.

The Grove Hospital, Leighton Buzzard, is being warmed and ventilated by means of Shorland's patent Manchester stoves with descending smoke flues and patent exhaust roof ventilators, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

North Wales Co operative Quarries, Ltd.—The report for the half-year ended June 30th states that considerable progress has been made with the opening up of Moel Faban, and the necessary machinery will be in readiness at an early date for moving the debris. Whilst it is not expected that slates will be produced in large quantities at this working for sometime, the development is sufficiently advanced to enable a start to be made on a limited scale.

Tees-side Building Strike.—The Tees-side bricklayers have refused to adopt the proposal of the masters that they should accept $\frac{3}{4}$ d. per hour reduction instead of the rd. originally asked for, with, however, the condition that there should be no limitation of the number of apprentices and an alteration in the walking time to work at a distance. Hence, though the strike has lasted three months, there is no immediate hope of its settlement.

United Builders' Labourers' Union.—The chief officers for the ensuing year have been appointed as follows:—General secretary, Mr. W. Stevenson (re-elected); assistant secretary, Mr. D. Haggerty; president, Mr. C. Ince (*pro tem.*). The Union recently drew the attention of the Home Office to the condition of the staging for a Scotchman on a certain building in London, with a view to its being inspected, in reply to which the Home Office stated that the only remedy was to draw the builder's attention to the same or apply to a magistrate for its demolition; however many building inspectors were appointed in addition to the present factory inspectors, their powers would be limited to those provisions of the Factory Act which by section 105 are applied to buildings. This reply the Union consider to be unsatisfactory, and they are more than ever convinced of the need for further powers of inspectors on building construction.

Manchester Water-Supply: Huge Undertaking.—The engineers anticipate that the contract for laying the second line of pipes from Thirlmere Lake to Manchester will be completed this month, thus placing the city in a very favourable position by the autumn. Twenty-four million gallons per day will then come along the aqueduct, which is about ninety-six miles long. Work on the scheme from 1885 to 1894 cost £2,500,000. The second part of the scheme has taken two years and a half to accomplish, and has cost about £600,000. It is intended to spend an aggregate of between four and five millions in bringing three more lines of pipes to Manchester, which will then have a supply of about sixty million gallons per day. Before Manchester tapped Thirlmere the level of the lake was 533ft. above the sea, but by the construction of the massive embankment the level will be raised 50ft. and the lake increased in length from $2\frac{3}{4}$ miles to over $3\frac{1}{2}$ miles, with a capacity of 8,155,000,000 gallons, equal to 150 days' supply if no rain were to fall during the time. The Manchester Corporation also propose to construct a reservoir near the city to contain a three weeks' supply.

Masons' Disputes at Glasgow and York.—The dispute between the master-builders and operative masons of Glasgow and suburban districts has assumed a serious aspect. The masters have decided to reduce the wages from 9d. to 9d. per hour.—At York there is great depression in the building trade, and matters have been made worse by the masons employed on the construction of the approach road to the Marine Drive, who have struck on account of labourers being allowed to do work which they state should be done by skilled men.

Removing a Monolith.—The Sheffield monolith, 30ft. high and weighing over 11 tons, has now been removed from Fargate to Endcliffe Park, where it is to be re-erected. The task was a somewhat awkward one. A scaffolding had to be built up and a jib fitted at the top for the chain and blocks. The granite needle itself is 20ft. 6in. high and weighs nearly 8 tons. Messrs. T. Lowe & Sons, of Burton-on-Trent, undertook the work. On the former site of the monolith at Fargate a memorial to Queen Victoria is to be erected.

Yorkshire Scheme for Closer Union between Masters and Men.—Yorkshire bricklayers and masons largely favour the proposal of the master-builders to establish a board of conciliation and arbitration, with district committees, to which all disputes shall be submitted; but the Yorkshire branches of the Amalgamated Society of Carpenters and Joiners have expressed their disapproval of the scheme by a majority of 1,595, only 312 voting in its favour. The decision, however, is not regarded as final. The head officials of the Carpenters' and Joiners' Union in their monthly report issued last week say: "We deplore this action, because we are convinced that the interests of members can best be promoted by cultivating a closer union between their employers and themselves, and we hope that if the opportunity again offers itself a more liberal view will prevail, and that our Society will emerge from the isolated position it now occupies in respect to this question."

The Columbian Fireproofing Co., Ltd.: Large Contracts.—The contract for the concrete floors and roof of the Ritz Hotel now being erected in Piccadilly has been let to the Columbian Fireproofing Co., Ltd., of 37, King William Street, London, E.C. The floors and roof will be of Columbian "double construction." The hotel will occupy the site of Walsingham House Hotel, recently demolished, and (it is claimed) will be the largest and finest in Europe. The architects are Messrs. Merves & Davis, of 5, Dean Street, Soho, and the builders Messrs. Waring-White Building Co., Ltd.: under the direction of Mr. R. A. Denell, of that company, a record job may be expected. Mr. Charles Merves was the architect of the Ritz Hotel in Paris and of many other buildings in France. The Columbian Fireproofing Co. have also secured the contract for the concrete floor and roof construction of the new offices to be occupied by the Amalgamated Shipping Companies—the White Star Line, American Line, &c.—on Cockspur Street. These premises will occupy the site of the building formerly used by Messrs. Hampton as offices. The architect is Mr. Henry Tanner, junr., the builders being Messrs. Waring-White Building Co., Ltd.

Fall of a Wall.—At a coroner's enquiry at Willesden last week evidence showed that eighteen months ago a Mr. Richardson, builder, erected in Drayton Road a gin. garden wall 90ft. long and 7ft. 6in. in height; without piers. A number of houses were being erected by another builder, Mr. William Poulter, and materials for making mortar estimated to weigh 50 tons were piled to a height of about 5ft. 6in. against the wall, which fell and killed two children. The

assistant surveyor to the district council said the lateral pressure on the wall would range from 168lbs. to 182lbs. at a point half-way from the ground, and 39ft. 6in. of the wall fell out, due, in his opinion, to the great heat on the outside of the wall causing it to become extremely dry and the pressure of the heap inside having been increased by recent rain, which had the effect of solidifying the sand and other materials. The jury censured Mr. Poulter for negligence.

Law Cases.

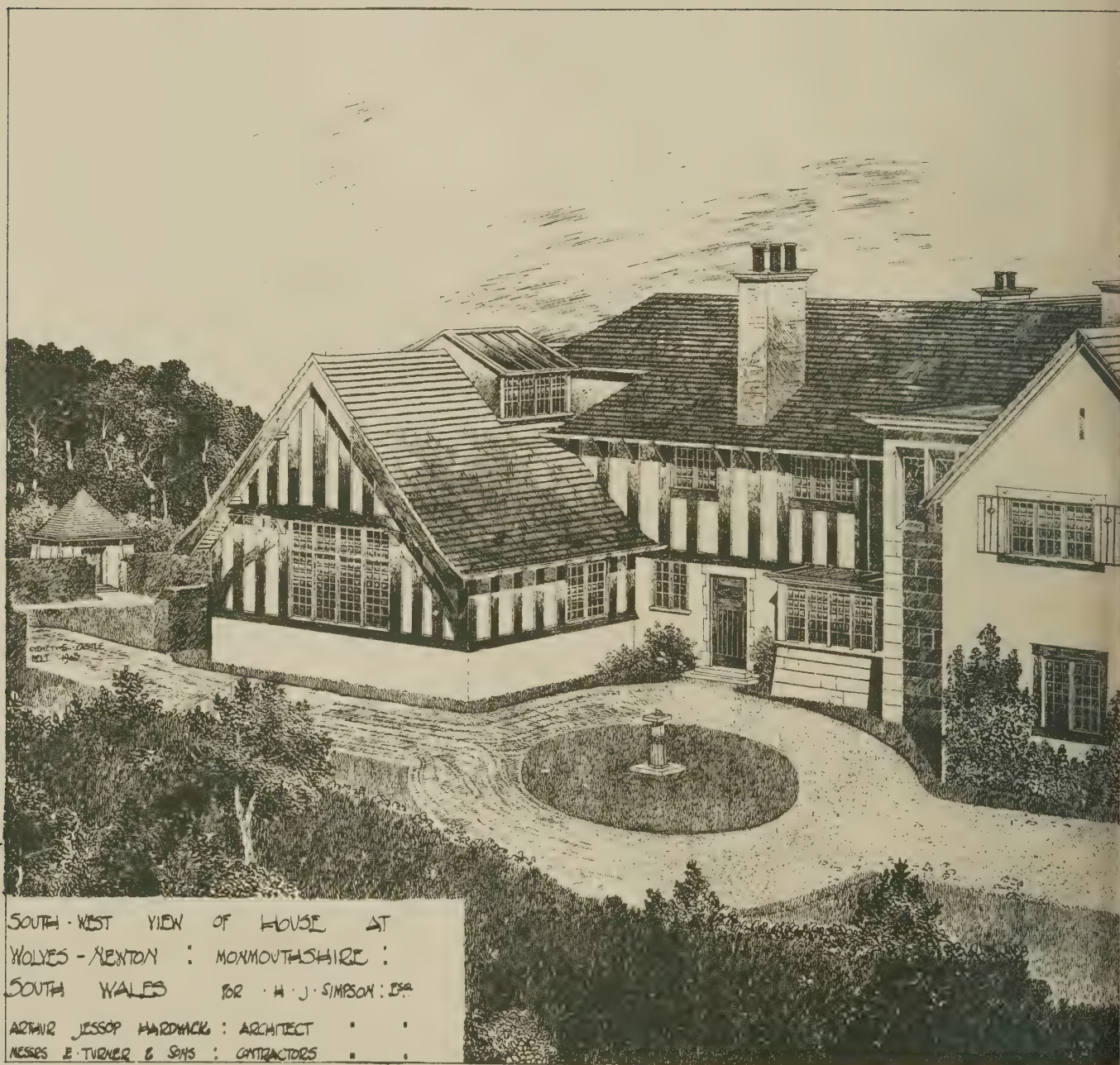
Fees for Plans.—Mr. William Thayer, a builder, sued John Hampshire, both of Loxwood, for £10 for fees for preparing plans of a house. He contended that he had received instructions from defendant to prepare plans and estimates, but did not get the job of building the house, and admitted that had he done so he would have made no charge for them. In defence it was urged that no instructions had been given plaintiff to get an architect to prepare plans, but only a rough sketch asked for with the estimates. The judge awarded plaintiff £5 5s. and costs.

Arbitration Enquiry.—An arbitration enquiry was held at the Surveyors' Institution Westminster, last Wednesday, before Mr. E. A. Gruning, sole arbitrator, respecting a claim brought by Messrs. Kirk & Randall against the Office of Works for the balance of money alleged to be due to them under their contract as builders for the erection of the new Savings Bank building at Kensington, which has been in occupation of the Department for over a year. At the conclusion of the arguments, which occupied two days, the arbitrator consented to state a case for the opinion of the High Court.

The Erection of a Party-Wall: Appeal Case.—The case of *Bullingham v. Pocklington* came before the Court of Appeal last week. The plaintiff complained of an order made by Mr. Justice Bucknill at Chambers directing that the action should be referred for trial to a referee. He explained that the defendant had served a party-wall notice on him under the London Building Act, 1891, in regard to certain alterations he proposed to make in his premises in Harrington Street, South Kensington. The alterations were carried out, with the result, plaintiff alleged, of causing the wall of his house to settle, owing to the negligence of the defendant's builder. He submitted that, the claim for damages being based on negligence, he was entitled to have his case tried by a judge of the High Court, with the assistance of a jury. The defendant denied that the work he had carried out had been the cause of the plaintiff's house settling, and he relied on the fact that the "list" had been away, and not towards, his premises. The District and Metropolitan Railways ran at the back, and therefore it was extremely difficult to obtain a view of the premises, and only a practised eye could really trace what had been done, as the work in the front had all been covered in. He submitted that this was a case that should be decided by a professional referee—in other words, by a surveyor who had special knowledge—and that, as a view of the premises was all-important to decide the question, the judge was right in holding that it could not be conveniently dealt with by a jury and directing it to be tried by an expert referee in order that the local investigation might be properly and conveniently made.—The Court thought that the balance of convenience was not enough to oust the plaintiff's right to have the case tried by a jury, and therefore the order appealed against was set aside, with a direction that the action should be tried in the ordinary way; the costs of this application to be costs in the cause.

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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.
Wednesday, August 24th, 1904.



SOUTH-WEST VIEW OF HOUSE AT
WOLVES-NEXTON : MONMOUTHSHIRE :
SOUTH WALES FOR H. J. SIMPSON : ESQ.

ARTHUR JESSOP HARDYCK : ARCHITECT " "
MESSRS E. TURNER & SONS : CONTRACTORS " "



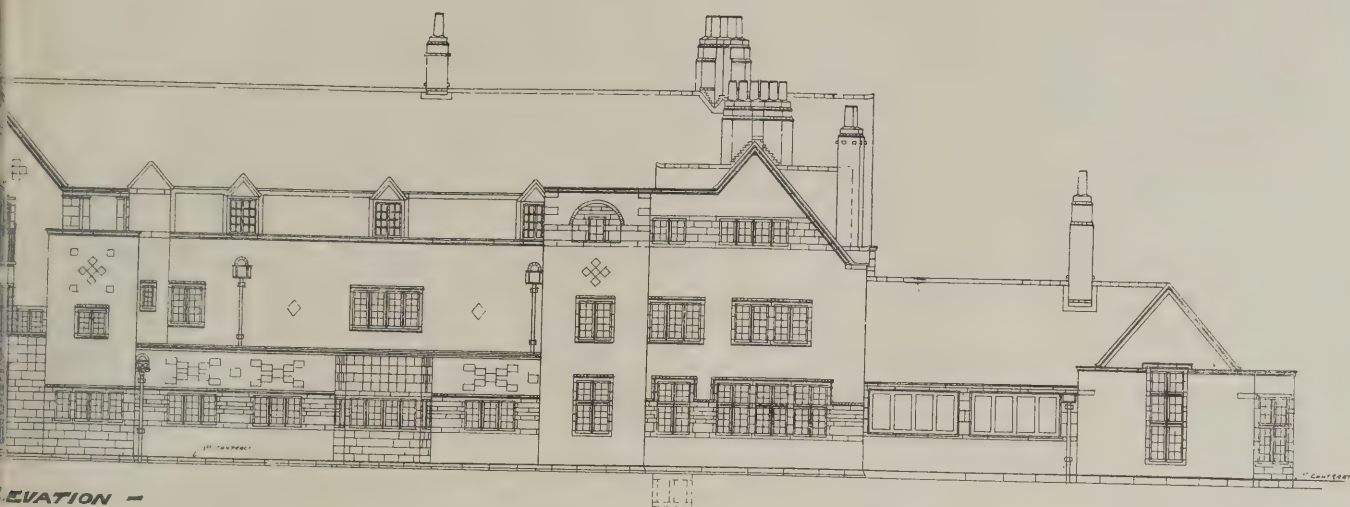
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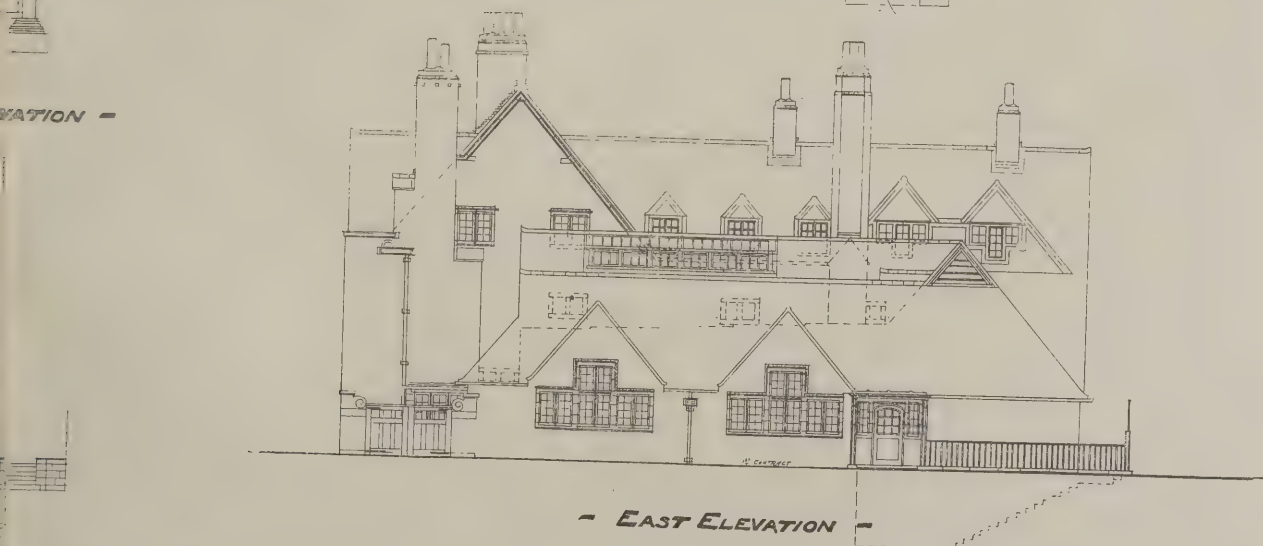
THE KING EDWARD VII. SANATORIUM, MIDHURST, SUSSEX: ADMIN



North Elevation -



South Elevation -



- East Elevation -

0 10 20 30 40 50 60 70 80 FEET

ON BUILDING.

H. PERCY ADAMS, F.R.I.B.A., ARCHITECT.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

August 24, 1904. Vol. 20, No. 498.

6, Great New Street, Fetter Lane, E.C.

Summary.

Before the engineering section of the British Association last week the Hon. C. A. Parsons said that in some instances the ignorance of an inventor had been a positive advantage, for if he had realized how much of his patentable work was honeycombed by previous publications and patents he would have lost heart and given up the task. But this was a case of the exception proving the rule; and the patentee ought, as far as possible, to know his true position and make his choice accordingly. (Page 99.)

London is not, like Paris to the Parisians, a home to the Londoner. He would live somewhere else if he could. French architecture is naturally urban and ours naturally rural. The Frenchman imagines a beautiful building in the town, the Englishman in the country. Speculative builders have erected half-timbered houses quite incongruous to London, but Londoners like them because they like anything in London which reminds them of the country. (Page 97.)

The question of architectural partnerships is an interesting one. A writer contends that if architecture is merely a business there is every reason for dividing the work, one man attending to design, another to construction, and a third perhaps to business; but he claims for it a higher aim than money-making, though he admits that a man may be just as one-sided in regard to art as to business. (Page 101.)

A correspondent in Canada writes to point out that wages and hours of labour are not so good as agents in this country represent them to be. (Page 100.)

The remnants of an old Fleet quay, where boats were discharged and smaller boats loaded to proceed up the creek now represented by Fleet Lane, have just been discovered. (Page 106.)

A seemingly fireproof partition has at last been produced which has withstood without damage, at a test made specially for our information, a higher temperature (namely, sufficient to melt steel) than any other on the market. (Page 104.)

Professor Petrie has discovered a gold statuette and a colossal group of figures in granite which he describes as the two finest objects found in Egypt for some time. (Page 99.)

The south gate of the Roman town of Caerwent, near Chepstow, has been brought to light. (Page xviii.)

The price of Carnarvon slates has unexpectedly dropped by $7\frac{1}{2}$ per cent., indicating considerable loss to the merchants unless the quarry owners grant a rebate. (Page 102.)

Two-tier theatres in preference to three are advocated by Mr. Sprague. He is the architect of the new Waldorf Theatre and another to be erected on Aldwych, also of a theatre for Mr. Seymour Hicks in Shaftesbury Avenue, and a large music-hall to be erected in Tottenham Court Road. (Page 102.)

Aphorism for the Week.

Necessity and common-sense produced all the common arts, which the plain folks who practised them were not idle enough to record.—HORACE WALPOLE.

Men by the Thousand.

THERE are some very interesting and instructive figures in the general report on the census of England and Wales for 1901, just issued. The cry that the architectural profession is a crowded one has been heard regularly for dozens of years; it is like the remark that "Punch" is not so good as it used to be, and the answer that "it never was"; but we are very rarely given any figures to support the contention that professions and trades in this country are packed full. Here however, are a few, taken from the census. In 1901 there were 10,775 men and 6 women returned as architects, as compared with 7,823 men and 19 women in 1891—a strong testimony to the herring-box assertions, so far as men are concerned, though the lady architects have fallen off 70 per cent.; hence the feared invasion of the feminine is not yet. To have nearly eleven thousand architects in England and Wales seems enough, but it is as nothing compared with the mighty hosts of the building trades. In 1901 these were as follows:—

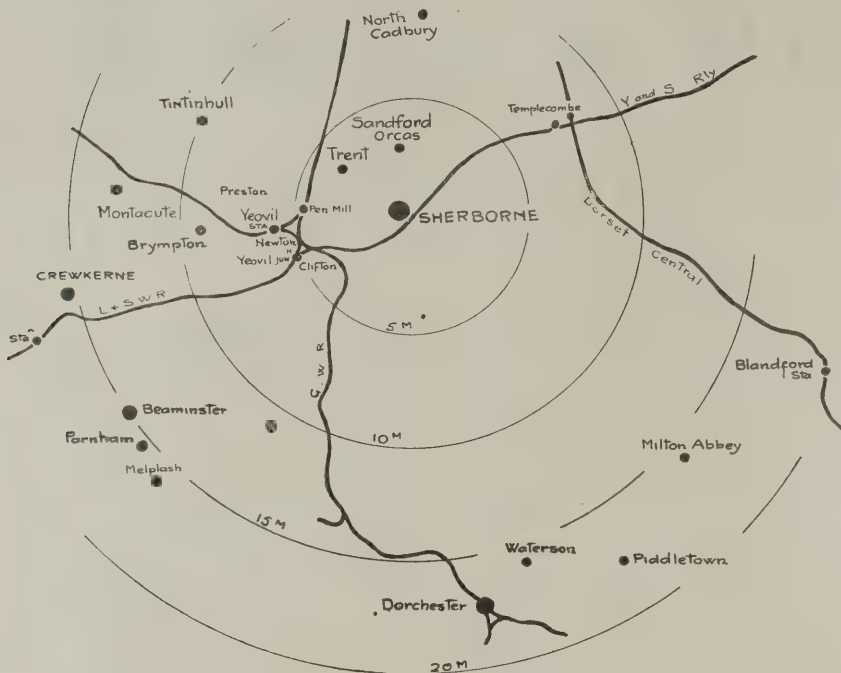
Carpenters and joiners	270,650
Painters, decorators and glaziers	160,001
Bricklayers	115,995
labourers	97,779
Masons	73,012
Plumbers	64,974
Builders	40,187
Plasterers	31,301
Builders' labourers	27,436
Masons' labourers	23,019
Gasfitters	16,328
Slaters and Tilers	9,796
Plasterers' labourers	6,853
Paperhangers and whitewashers	6,437
Land, house and ship surveyors	6,414
Locksmiths and bellhangers	1,256

Of the foregoing no fewer than 186 women are returned as painters and decorators, 177 as builders, 115 as plumbers, 99 as paperhangers, 53 as carpenters and joiners, 42 as masons, 7 as gasfitters, 4 as bricklayers, 3 each as tilers and plasterers, and 2 as locksmiths. It appears also that 485 deaf and dumb men are connected with building and works of construction.

Standardizing British Measures.

For some time an influential agitation in favour of the adoption of the Metric system in this country has been going on. Now a new association has been formed, called the British Weights and Measures Association, which has for its primary object the combating of this decimal system. The provisional committee which has been formed is a strong one. It consists of Messrs. H. Lovatt (the well-known builder and contractor of Wolverhampton), A. H. Adams (of the Sturtevant Engineering Co., Ltd., heating and ventilating engineers, of

London), Thomas Parker (consulting engineer of Wolverhampton and London, who designed the Liverpool Overhead Railway, the first electric railway to standard gauge, and is now in charge of the electrification of the Metropolitan Railway), Col. F. W. Tannet-Walker (of Tannett-Walker & Co., Ltd., the noted hydraulic engineers of Leeds), Walter M. Musgrave (of John Musgrave & Sons, Ltd., of Bolton), Lincoln Chandler (of the Patent Shaft and Axletree Co., Ltd., Wednesbury), Archibald Denny (the ship-builder of Dumbarton), Howard A. Allport (colliery owner of Barnsley), Robert Kaye Gray (of the India Rubber, Gutta Percha and Telegraph Works Co., Ltd., of London, who is the present president of the Institution of Electrical Engineers), and James Paxman (of Davey Paxman & Co., Ltd., of Colchester, and the High Sheriff of Essex). Mr. George Moores, F.S.S., is the secretary, and the offices are at 25, Victoria Street, London, S.W. It will be seen from the above names that the committee comprises influential men who are well entitled to speak on the subject. Their view is that the foisting of the Metric system on British trade would cause incalculable injury, and we think this view will commend itself to members of the building trade, who have to deal practically with the subject of weights and measures, whereas the advocates of the Metric system are mostly theorists. The Association is not so much averse to a decimal system, though such a system is almost impossible of application without a decimal coinage first, and, after all, though a decimal system is very advantageous for computations, it has the inherent defect of being contrary to the system of continual halving which is natural, and customary to all nations and races. Whatever reforms are made must be very gradual. A second object of the Association is to standardize and simplify our weights and measures, and in this probably will do most service, for speaking as to the building trade, with which we are chiefly concerned, the multitude of different measures for the same class of goods is most vexatious and productive of loss of time and money; for quotations are often given without it being certain what measure is intended, and thus misunderstandings arise necessitating delay in confirmation. It is absurd to think that cement and lime are sold by the ton, cwt., cental, yard, cubic foot, hundred, peck, chaldron, measure, basket, bushel, or bag; and again brickwork measured by the rod or cubic foot, and that there are five standards in timber (though one is generally used), while wood is sold by the load, standard, cubic foot, square, bundle, log, float or cord. The Engineering Standards Committee is doing good work, and this Association, we hope, will do great service also.



THE A.A. EXCURSION TO SHERBORNE.

Some Notes and Sketches by Leonard Sutton Wood.

LAST week the Architectural Association went on their annual excursion, when Sherborne and its neighbourhood were visited. Sherborne is a small town in the north-west of Dorset, near the Somersetshire border.

The district is perhaps not so rich in architectural beauties as some of those visited by the Association in former years, but the list of places includes some of very great interest. Sherborne itself contains much interesting old work besides the abbey church, which is too well-known to need description. The castle, situated on a knoll just outside the town, was originally the seat of the Bishops of Salisbury; a brass to Bishop Wyvill in Salisbury Cathedral shows him seated in his castle of Sherborne with his champion before the gate. The grammar school, the market cross (Perpendicular work with a good groined roof), and

the old half-timbered houses near it are particularly interesting, but examples of ancient domestic work are to be seen at every turn. The old metal casements with scrolled hinges and slide-ends seem very common in

and spire, the latter a late addition, in the Decorated style; also some interesting though rudely-carved stall-ends, and a very rich pulpit and oak screen of sixteenth-century date. The manor house, close by, was one of the refuges of Charles II. after the battle of Worcester. The village contains several old houses exhibiting late sixteenth-century work.

Beaminstre (visited on Tuesday) is a quiet little town six miles from a railway station. It contains very little of interest except the church, which has a noble tower of early fourteenth-century date, somewhat marred by the insertion of a large Perpendicular window near the base. The sculpture on the west side in the form of a cross is very curious. The mansions of Parnham, Melplash and Mapperton all lie close to Beaminstre. Parnham is a fine old Tudor house rebuilt in Henry VIII.'s reign. It was originally the home of the Strode family. The present owner has filled it with a collection of old furniture and works of art from all parts: in fact, the interior is like a museum and retains very little of its original character except in the great hall. Amongst other objects of interest inside is some of the fine stained glass brought from Henry VIII.'s palace of Nonsuch, now destroyed. The oriel window over the front porch is typical late Perpendicular work: examples very similar to it are found at Montacute Priory, Clifton Maybank, Brympton, &c.

Crewkerne, about six miles north of Beaminstre, was also visited on Tuesday. The church is a fine Perpendicular building. The



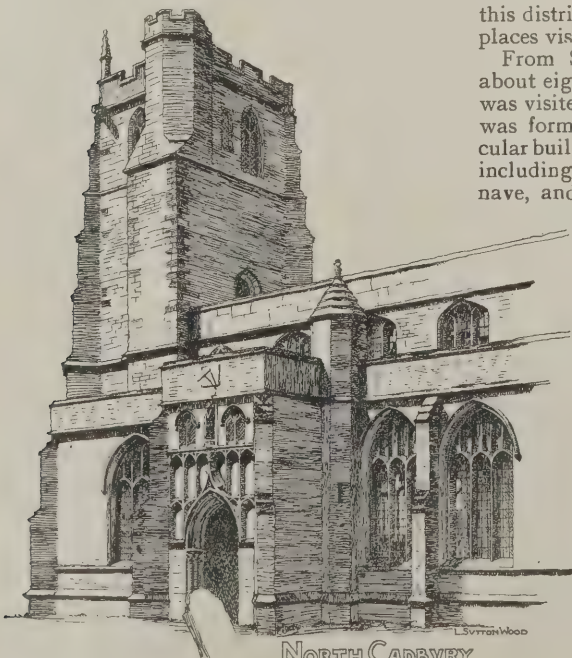
THE HALL NORTH CADBURY.

this district; we saw them at nearly all the places visited.

From Sherborne it is a pleasant run of about eight miles to North Cadbury, which was visited on Monday. The church, which was formerly collegiate, is a fine Perpendicular building with many interesting features, including a good carved wooden roof to the nave, and stall-ends of quaint design with figures of men and women in mediæval costume—characteristic portraits no doubt, though not beautiful. The church also contains some altar-tombs with effigies, one of which is to Lady Botreaux, who built the nave. The south porch is a good example of Perpendicular work. Adjoining the churchyard is Cadbury House, a picturesque old pile of architecture of various dates and styles, the earliest part dating from the end of the sixteenth century. The south front has been modernized; the north is Tudor work with fine bay windows.

Trent, three miles from Sherborne, was also visited on Monday. The church has a beautiful tower

groining of the south porch is worthy of note and the roof of the north transept is a fine though late specimen of carving. Some of the roof corbels are beautifully carved in the typical Perpendicular style, with angels clasping shields. The very thin piers



NORTH CADBURY

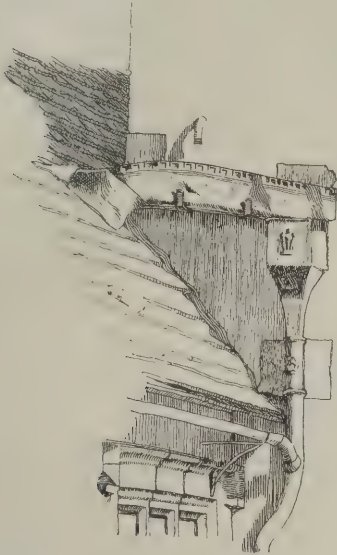


STALL END, NORTH CADBURY



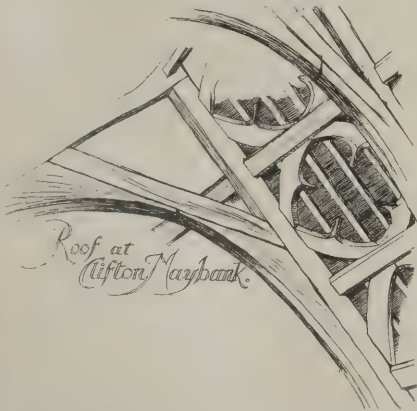
ABBOT'S TOMB, BRYMPTON

supporting arches of very wide span in the nave give an appearance of weakness to this part of the structure. The modern stone groining under the tower shows that modern work can be made equal to the old.

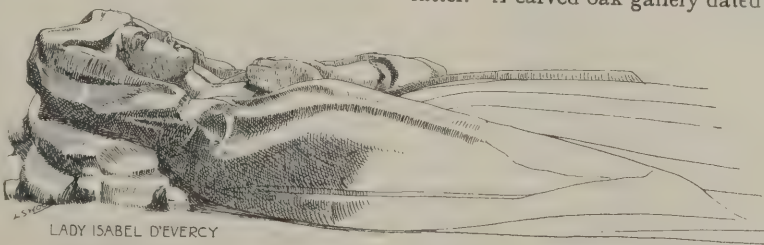


RAINWATER PIPE-HEAD, BRYMPTON HOUSE.

Clifton Maybank (visited on Wednesday) is an old manor-house close to Yeovil Junction. It was once the residence of the Horsey family, and must have been very fine



originally, but only a wing of the original house remains, the remainder being dispersed at a sale last century, when the front was conveyed to Montacute and re-erected on

LADY ISABEL D'EVERCY
BRYMPTON DEVERCY CHVRCH.

BEAMINSTER

the west side of the house. An interesting old roof in bad repair and a panelled oak door of original design are still left in what is now used as a cider cellar.

Brympton D'Evercy, another of the great mansions of the district and the seat of Sir Ponsonby Fane (also visited on Wednesday), is in the immediate neighbourhood. The house is in several different styles. The west front dates from the time of Henry VIII., but the south side has been altered in the Italian style. There is much fine old leadwork in fall-pipe heads and gutters. The small church close by the mansion is chiefly of the Decorated period. It is disfigured by an exceedingly ugly belfry of later date. The interior contains many objects of interest, including a stone screen with a seat running along it dividing some very fine tombs with effigies in the side chapels, some of which are of members of the D'Evercy family, the original owners of the soil.

The churches of Somerset are noted for their towers and carved woodwork, and Piddletown (which was visited on Thursday) contains some splendid examples of the latter. A carved oak gallery dated 1635 fills

the western end of the church, but not obtrusively; the pews are of the old boxed-in type, and besides the pulpit and two beautiful old chairs in the chancel there is a fine old carved chestnut roof. The font is of the Norman period, but the carving on it is

ROOF CORBEL
CREWKERNE.

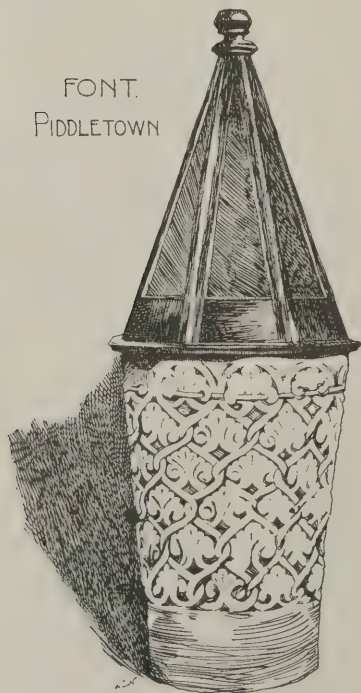


PIDDELTOWN CHURCH.

Byzantine in character. In the side chapel to the south are some very fine tombs to members of the Martyn family. The knight on the canopied tomb is, I should imagine, one of the most perfect mediæval effigies left to us in England. The armour, which appears to be of the type worn during the French wars, is very beautifully executed. The exterior of the church is not of much interest. At the vicarage adjoining is a room which was originally the study of the famous Cardinal Pole.

Milton Abbey and Waterson were also visited on Thursday, the party arriving at Yeovil in the evening. The town was explored next morning, particular attention being given to the church, which is an imposing structure of Perpendicular date but

of very little interest. The party then went on to Tintinhull, locally known as "charming Tingle." This is a picturesque little village a few miles from Yeovil. It possesses some charming old houses and inns. The

FONT.
PIDDELTOWNFROM
MONTACUTE
HOUSE.

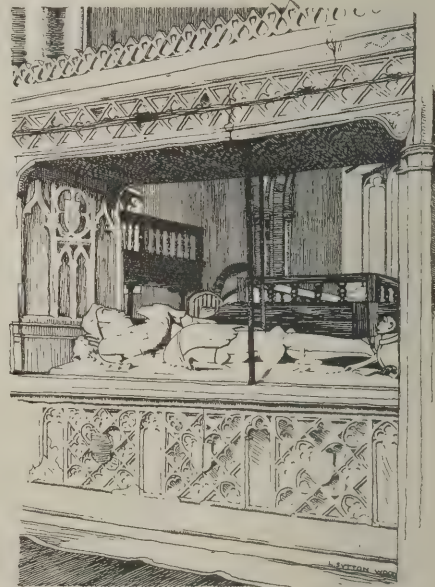
church has very little of interest except some carved stall-ends. The stone piercing to the tower windows is curious. We saw different patterns of this stone piercing in the towers at North Cadbury and Trent—at the former in the form of stone lattice-work.

The chief visit on Friday, however, was to Montacute House, a magnificent structure in

the early Renaissance style, built about 1580 for the Phelps family by John Thorpe. The garden front is plain and severe but has a noble effect. Over the door is the hospitable motto:

Through this wide opening gate
None come too early, none return too late.

The west front from Clifton Maybank is more ornate in style, but blends well with the rest of the building. The porch is very richly carved. The lozenge-shaped panel over the doorway, in which may be seen the initials of the Horseys, I.H. and E.H., is a delightful example of florid Renaissance work.



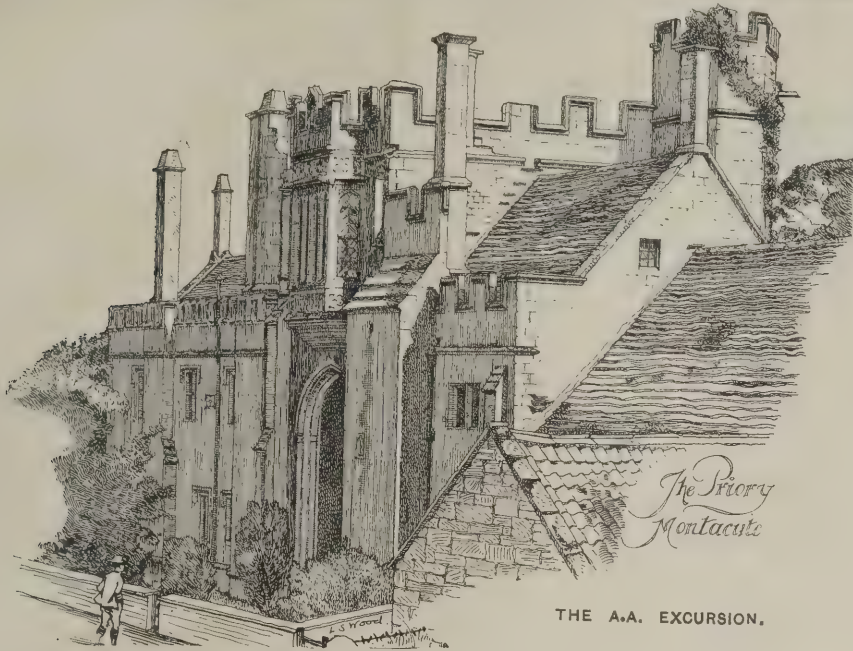
MARTYN TOMB (15TH CENT.) PIDDELTOWN.

The village of Montacute also contains some interesting old houses and the remains of a Cluniac priory standing at the base of St. Michael's Mount.

After visiting Montacute House the party went on to Preston Grange, in the village of Preston Plucknett, close to Yeovil. This was probably a grange or farm connected with Sherborne Abbey. It is apparently late Decorated work of about 1400. Part of it is ruinous, but the main part is still occupied.

Friday's visits brought the excursion to a close. Early next morning the party journeyed back to town, having spent a most delightful week.

Alterations at Eton College.—Several important alterations and improvements are being carried out at Eton College during the holidays. In the chancel of the ancient chapel the pavement between the altar rails and nave has been removed, and the space concreted in readiness for re-flooring with black and white marble tiles, each 1 ft. square. The new arrangement, which has been entrusted to Messrs. Farmer & Brindley, of Westminster Bridge Road, includes seven steps between the altar and the body of the chapel. Some improvements in connection with the organ are also in progress in the ante-chapel. At the "Queen's Schools," in Keate's Lane, a new wing known as the Lawson memorial, a reminiscence of the fatal fire at Baldwin's Shore, is being built of red brick and white stone, and near the Lower Chapel a large new master's house is in course of erection, a portion covering the site of the old music-room. The new music-room is now located in the building opposite the Lower Chapel, once used as a racquet court. In the High Street Messrs. Watson, of Ascot, are erecting a commodious fire station for the Eton Urban Council at a cost of about £2,500.



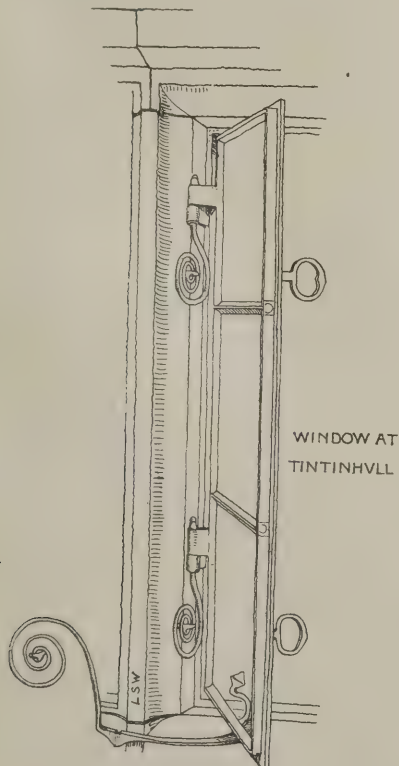
THE A.A. EXCURSION.

THE LONDON OF TO-DAY.

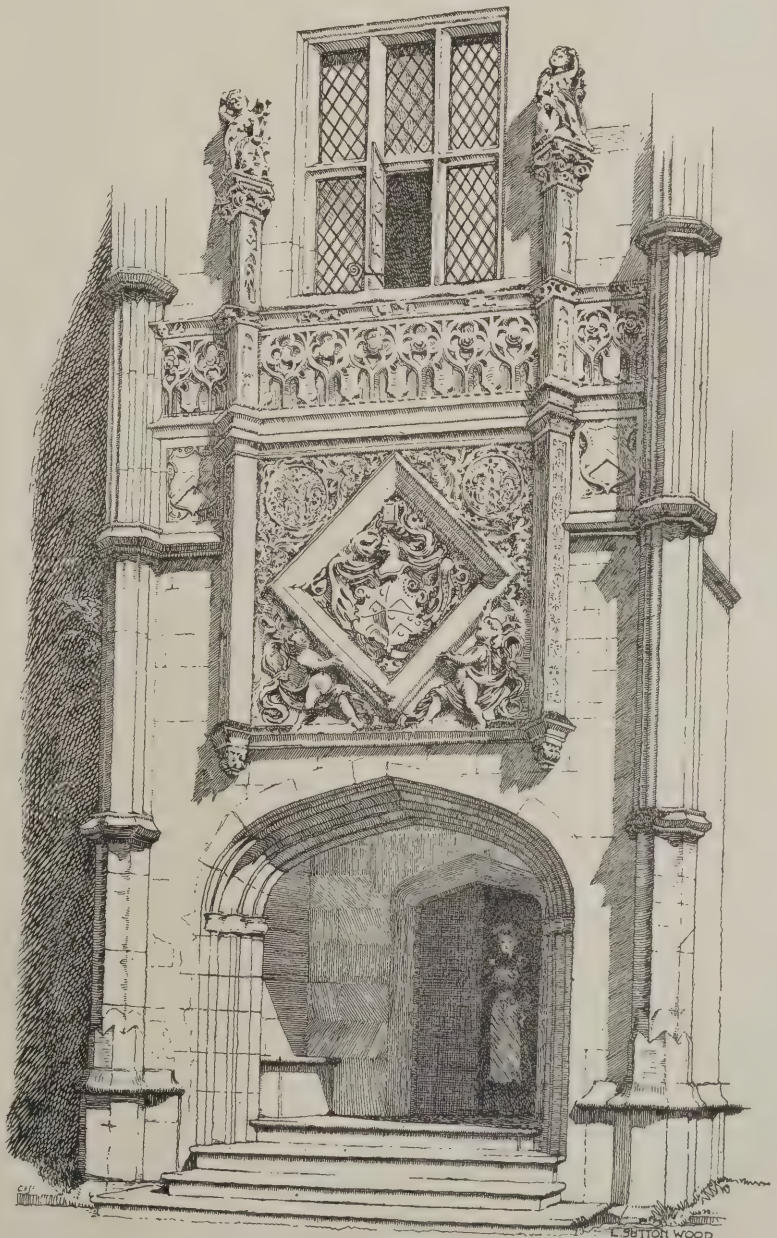
A Comparison between English and French Tastes.

BEGINNING with a reference to the old eighteenth-century houses behind Dean's Yard, Westminster, and the agitation raised a short time ago against their demolition—which agitation we were among the first to start—a writer in the "Speaker" deals with the lesson of modern architecture in London. He observes that by reason of our clinging to the few houses of a London that has been, it is plain we are not content with the London we ourselves have made and are making. London is not, like Paris to the Parisians, a home to the Londoner. He would live somewhere else if he could. "Our fathers, though contented with ugliness, did not produce anything so ugly as our discontent is now producing. They built houses that were mere boxes of masonry, partitioned off into cells, and pierced with square holes to admit

light and air. Our attempts to ornament these boxes are often as random and discordant as the attempts of a man to play the fiddle without a lesson. We have a blind instinct that some kind of ornament is needed. We apply it as women of no taste tack bows and flounces on to their dresses, with the result that our ornament is, like dirt, merely matter in the wrong place. . . . But in most kinds of art the sense of direction is steadily growing. Even the mere commercial imitators imitate now the handiwork of artists in nearly everything except town architecture. Their imitations are of no account in themselves, but they show the tendency of taste. Only in town architecture the speculative builder seems to have no guide but his own vulgarity. . . . His buildings are designs, like posters, to shout down any other buildings near them. . . . Yet the example of the French proves that it is not impossible, even in an age of mediocre building, to produce a decent town architecture. The buildings in the Place Vendôme are not excellent, but they have a comfortable effect. . . . The French design their town houses in blocks with Palladian or other kinds of classical façades; and we have sometimes imitated them, but always unintelligently and as a mere matter of



WINDOW AT TINTINHULL



PORCH AT MONTACUTE HOUSE, ORIGINALLY AT CLIFTON MAYBANK



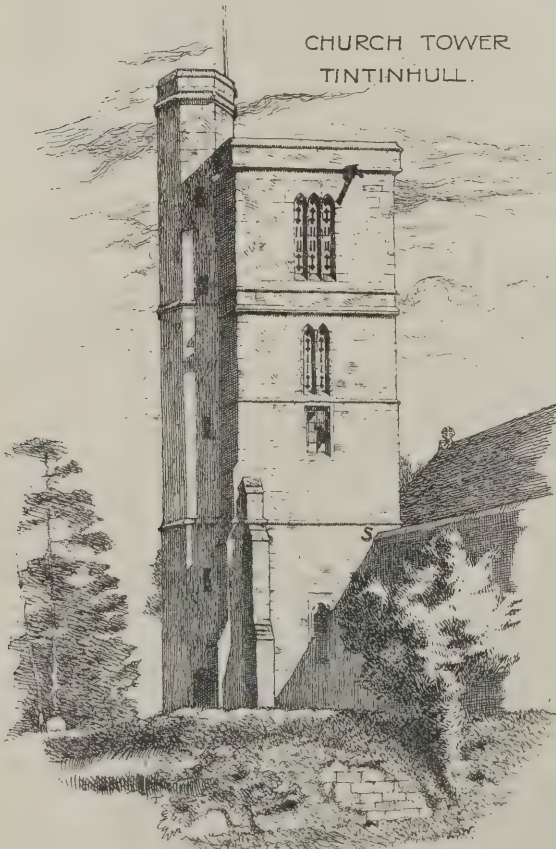
PRESTON GRANGE

fashion. In designing such façades, or in any kind of machine-made town building, we are far behind the French; as far as in other kinds of architecture we are ahead of them. In fact, the French architecture is naturally urban and ours is naturally rural; and this has always been so. . . . In domestic architecture, too, the French masterpieces are palaces that have their own courtly air about them, and impose their own magnificence upon the earth that bears them. But the English masterpieces are country houses that seem to be almost as much a natural growth as the woods and meadows among which they stand. In fact, the Englishman imagines a beautiful building in the country and the Frenchman in the town. There is a remarkable revival of architecture in England, but the best of it

china was better suited to a cottage than to a palace, and now all the best of our revived art, though the producers of it may live in towns, remains obstinately rural. William Morris, the chief originator of the revival, hated the town and loved the country. His imagination worked not upon palaces but upon old timbered houses. Everything that he designed was better fitted for a country than for a town house. When he tried to be florid or sumptuous he was at his worst; and all our best architects and designers are like him in this. They build houses which all seem to need a garden to set them off, even when they stand in a London street. They design furniture too simple and rude for a town drawing-room. And so deep is the taste for country things, even in town-bred people with no reasonable or conscious sense of beauty, that this rudeness seems to them essentially artistic, and there is now a fashion for machine-made articles imitating the roughness of the rustic craftsman, and losing thereby the neatness and precision which are the only merits possible to them. Nothing has ever been produced so bad as the 'art' furniture of Tottenham Court Road or the 'art' buildings that are rising all about London; but there is something pathetic in



HOUSE AT TINTINHULL.

CHURCH TOWER
TINTINHULL.

is nearly all inspired by old country buildings and seems to be designed for the country. There is, for instance, a fine block of flats lately built in the street between Eaton Square and Sloane Square. In spite of its height and size it has a curious rusticity about it, and all the designer's fancy has been spent upon the features and details that give it this rusticity. Even the speculative builders have broken out into strange rural experiments, timbered houses and the like, which are significant of the general taste of Londoners. These houses are as incongruous to their surroundings as a milk-maid in the Strand; but Londoners like them because they like anything in London which reminds them of the country.

"The English imagination will not acclimatize itself to a town. Our art is a wild plant, and needs a pure air and to be fed with the beauties of nature. In the eighteenth century it was more urban than at any other time, but even then the most beautiful English

their badness, something that offers a faint hope of better things. . . . They are produced by men always thinking of conditions that do not exist, and possessed therefore by no sense of fitness, controlled by no established tradition that might preserve them from extravagance and perversity. Their work is and must be unreasonable and unpractical, both expressing and producing not tranquillity but discontent. Yet in that very discontent lies the hope of better things . . ."

No. 14, York Place, Portman Square, London, W., has been commemorated with a tablet as the house where William Pitt resided during 1803-4.

Trinity Hospital Chapel, Leicester. — The much-needed renovation of this chapel, a building of considerable architectural and antiquarian interest, which does not seem to have been included in the general scheme of restoration and rebuilding that took place about three years ago, has now been undertaken, and it is hoped that the building will be formally opened by the mayor during September. The architects are Messrs. R. J. & J. Goodacre, of Leicester. The cost of the work will be about £1,000.

BRITISH ASSOCIATION.

THE British Association opened its 1904 meeting at Cambridge last Wednesday, when Mr. Balfour delivered his presidential address. On Thursday the several sections held meetings. The Hon. C. A. Parsons, inventor of the well known turbine engine, presided over the Engineering section, and dealt with the progress of invention and its discouragement by our

Patent Laws.

In England, he said, the applicant for a patent had far more difficulty than in Germany or in America to find out what had already been done. He had to spend much time and trouble, to be kept waiting, and to be delayed in reaping the benefits of his invention. This, in all probability, had already cost him much, and then came the additional burden of getting a patent. Often such a one was ill-provided with funds; in fact, almost always the inventor was obliged to co-operate with a capitalist or a syndicate, which entailed many drawbacks. The existing laws made no proper provision for cases where the invention was an improvement; sometimes a patent would be refused on the ground that it had been anticipated, and yet this change might really make the whole difference between the general idea being a commercial success instead of a failure. Formerly there was no time limit to anticipations, but now they were restricted to fifty years back. But it would be much fairer if the law provided for the division of the profits in equitable shares between the parties interested.

Many inventors, said Mr. Parsons, avoid the expense of searching the patent records to see how far their problem has been attacked by others. "In some cases the cost of a thorough search is very great indeed. In some instances it may be said that ignorance has been a positive advantage, and that if the patentee had realized how much of his patentable work was honey-combed by previous publications and patents, he would have lost heart and given up the task. It is, I think, a case of the exception proving the rule; and the patentee ought, as far as possible, in all cases to know his true position and make his choice accordingly. The present patent law has some curious anomalies. Let us suppose some inventor has the good fortune to place the keystone in the arch of an invention, to add some finishing touch which makes the whole invention a complete success and valuable. Then others try to reap the results of his labour and good fortune, and, as often happens, it is discovered, after laborious search, that someone else first suggested the same keystone in some long-forgotten patent or obscure publication. What does the law do? It says this is an anticipation, and instead of apportioning to all parties reasonable and equitable shares in the perfected invention, to which no one could object, it says that the patent is injured or perhaps rendered useless by the anticipation, and that its value to everyone concerned is thereby diminished or destroyed, as the case may be, and thrown open to the public."

At the conclusion of the address Mr. Balfour, on behalf of a German engineering society, presented to Mr. Parsons a medal in recognition of his services to science.

Before the section devoted to Economic Science and Statistics, Professor Smart read a paper on

Municipal Housing.

taking Glasgow as an illustration. He pointed out that for a municipality to add a new competitive industry to its activities was a serious matter from three points of view. In the first place, house-owning was a business of a special kind, and one in which success was not certain. Secondly, the municipality entered into direct com-

petition with its own ratepayers, and that in a way quite distinct from the case in which a municipality might provide all the water, gas, electricity or tramway service which its citizens might demand. Thirdly, the municipality, by pledging the public credit for a new debt, was probably preventing the expansion of municipal activity in other directions. Yet these considerations were not decisive against municipal housing, which in some respects was as necessary for the protection and encouragement of the community as the provision of gas or water. For example, a sanitary and comfortable house among quiet neighbours was a direct condition of the efficiency of labour, and was quite definitely one of the factors of wage-earning. In other words, a good house as compared with lodging in a slum brought with it the possibility of paying for it. The point which especially suggested municipal house owning was that municipal control over certain classes of houses was necessary in the wage-earners' interests. But while the attractiveness of a clean city, to be secured by these means, was one thing, the inducement of low rents was quite another. Was a municipality, in its desire to provide a clean city, to provide also low rents at the expense of the general ratepayer? In special circumstances that might be justified. The chief thing that a municipality had to do was to see that the old problems of insanitary and overcrowded houses, which its own inaction had allowed to come into existence, should not recur.

Before the Anthropology section Professor Oscar Montelius read a paper on

"The Evolution of the Lotus Ornament."

He observed that in Egypt the lotus had been represented from the earliest times as real flowers, often together with buds and leaves, or as ornamental patterns. The lotus was drawn as well in the realistic form as in a conventional shape. The flower, figured in the more realistic way, showed numerous petals which were pointed. The petals in the conventional flowers were rounded; often the number of the petals (sepals) was only three. The lotus was often combined with spirals, especially in the eighteenth dynasty. Not rarely two or more conventionally-drawn flowers were placed one upon the other. Many Egyptian ornaments were formed by alternating natural and conventional lotus-flowers or by alternating lotus-flowers and lotus-buds. In Assyria, where the lotus-ornaments were later than in Egypt, both the realistic and the conventional lotus were also found. The latter was generally called "palmette." In Assyria, as in Persia, the ornaments were often formed by alternating realistic and conventional lotus-flowers or by alternating lotus-flowers and lotus-buds. Similar ornaments were also common in Cyprus and on the isles off the western coast of Asia Minor. In Cyprus, as in Phœnicia, the conventional lotus often had a peculiar form (the "Phœnician" or "Cypriote palmette"). In Greece the lotus occurred already in the Mycenaean time, but it became common there only in the first millennium B.C. There, as in the Orient, the lotus was found in combination with spirals, the realistic and the conventional lotus alternating ("lotus and palmette"), as well as the lotus-flower in alternation with the lotus-bud. Many capitals of Egyptian columns had the shape of a lotus-flower. Similar capitals occurred also in Asia Minor, where they gradually got the form known as the "Ionian capital."

A short discussion took place in which Sir John Evans mentioned the connection of the *fleur-de-lis* with the Ionian capital, and Prof. Flinders Petrie expressed his pleasure that Professor Montelius had accepted so much of Goodyear's work as set out in his book, "Grammar of the Lotus"; but sounded a note of warning as to the idea of the lotus

being the sole origin of the ornamental patterns. The papyrus plant had had its influence, and doubtless combinations of the papyrus and lotus had been evolved by all ornament makers during various periods.

Professor Petrie's Discoveries in Egypt this Year.

Professor Petrie read a paper on recent excavations at Ehnasya, about 70 miles south of Cairo and ten miles from the Nile. During the present year he went to work on the site and found the two finest objects that had come to light in Egypt for some time—a gold statuette of the god Hershefi and a colossal group of figures in granite. The statuette was of the finest work in the anatomy of the muscular treatment and proportions, and was probably the largest gold figure and perhaps the most artistic that had yet been found in Egypt. He had uncovered to its lowest foundations not only the central hall of the temple found by Dr. Naville twelve years ago, but also a large space of the chambers behind it and a still larger space of a great court with colossi in front of it. He had thus the history of another great Egyptian temple worked out as far as possible. The two rows of colossi were placed by Ramesse II. (1300 B.C.), and were of limestone, 25ft. high. There were also two colossal groups of figures of Ramesse between Ptah and Hershefi, the local god. One of these triads was seated and was now broken; the other group was standing, 11ft. high and 8ft. wide, weighing about 20 tons; it was the finest such group known and will be placed in the Cairo Museum. The floor of the temple was raised at various dates. About 600 or 700 B.C. when another raising of the level was undertaken, the builders inserted drums of quartzite sandstone beneath the columns, rather than lift the great blocks of granite that formed the basements of the colonnade. This strange device had not been seen elsewhere. The gain in method of the present year had been in following the history of building by tracing the several sand-beds between the stones. No builder ever put some inches of sand between his courses of masonry. Hence when layers of sand were found between stones it proved that a complete refoundation was made; the stones below the sand-bed having been left sunk in the ground and ignored, while a layer of sand was laid over them for founding a new temple. Thus the view, exposed in the digging, of many courses of stone, separated by three or four beds of sand, could be read off as recording the founding of so many separate temples.

The Ancient Ruins of Rhodesia.

Mr. R. N. Hall read a paper on recent explorations in Rhodesia. He said he had just completed, on behalf of the Chartered Company, over two years' exploration and preservation work at the ruins of the Great Zimbabwe. It was now believed that the eastern half of the Elliptical Temple, and that which contained the best built and most massive walls, and also the sacred cone or "high place," was the oldest structure at Zimbabwe, while the western portion was surrounded by a wall of later and poorer and altogether slighter construction, probably of the thirteenth century, or somewhat later, which wall took the place of a more substantial wall with a wider sweep outwards towards the west. Altogether the recent work brought the mystery of these ruins much nearer solution, and it was confidently anticipated that when the full statement of the results of the recent examination had been considered by experts it would be possible to speak more definitely as to the original builders. No ancient sign-writing had been discovered, but old post-Koran writing on pottery was found in some minor ruins now known to have been occupied by the Arab colonists.

WORK IN CANADA.

Two Sides of the Question.

AT a time when building trade workmen in this country are constantly thinking of emigration to one or other of our Colonies, or to America, where they hope to find better employment, it is instructive to give the two following letters, both of which appear in the August circular and report of the United Builders' Labourers' Union:—

ASSOCIATED BRITISH CANADIANS.

Head Office: Glasgow.

Dear Sir,—In reply to your letter I beg to say that we have orders for bricklayers for Toronto, the combined ship and railway fares in Canada being £6 19s. 7d. We guarantee a situation at a minimum of 2s. 3d. per hour, fifty-five hours per week; such situation to be found for you within one week from arrival.

For being personally conducted from London to your destination, where you will be met by our local agent who will find you accommodation at the lowest rates and afford you every facility, we charge a fee in excess of the above-mentioned fares of 7s. 6d.

We require one original business reference, which we will copy and return to you, and two personal references, as we only guarantee work to competent and desirable men. Should you decide to book as above, it will be necessary for you to call here to pay for and receive ticket and signed agreement by May 19th at the latest, when I will give you luggage labels and full instructions.

Free railway is arranged from London to Liverpool, leaving Euston at 12 o'clock p.m. on the 23rd day of May. From all other stations and by any other train, fares must be paid to Liverpool.

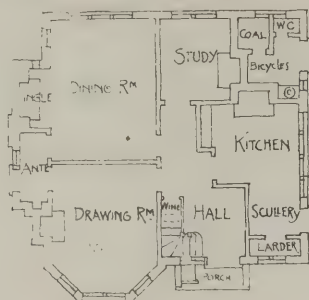
Yours faithfully,

F. BOWEN, Agent.

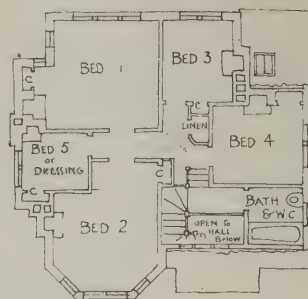
8 Balfour House,
Finsbury Pavement, London.

93, Davenport Road,
Toronto, Canada,
July 10th, 1904.

Dear Sir,—The enclosed misleading letter (above) I got from a bricklayer who has just come out here, and I wish it published so as



GROUND FLOOR



FIRST FLOOR



HOUSE AT SYNDRIDGE PARK
BROMLEY
FOR H.C. NIXON ESQ.

E.B. LAMB, ARCHITECT

This house (of which there is a pair) is built with red bricks, rough-casted, and purple tiles. The houses are both nearing completion and have cost about £700 each.

to warn intending immigrants against the lying agents at home, who tell them that the wages (in this case) are 2s. 3d. instead of 1s. 10d. per hour and the working hours fifty-five per week instead of forty-four, and that their agents will get them a situation in one week from time of arrival. Now this man was here three weeks, and had to go labouring at ten dollars instead of working at his own trade. He asked me for a job, and whilst talking to me he showed me this letter, and it was then I found out he was a bricklayer. I asked a bricklayer foreman if he would give him a job, which he did. The agents referred to in the letter are no other than the Manufacturers' Association

and Builders' Association, and they are to be used against us as organized workers. You might perhaps want to know how this case of a mechanic affects us as labourers. It is nothing strange here to find mechanics and men with a trade engaged in work that an ordinary labourer should be doing, such as a blacksmith working with navvies, and in winter time in the breweries and big packing houses. You can see the mechanics, who are earning double the wages in the summer the labourers do, taking the places labourers should have. I would like you to give this thing as wide publicity as possible.

Yours truly,

JAMES H. GARLICK.

TWO HOUSES.
STUDLAND BAY
DORSET.

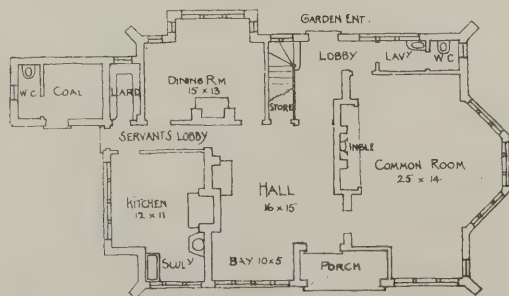
FOR RALPH BANKES ESQ.



ELEVATION TOWARDS GARDEN



ELEVATION TOWARDS SEA



5 BEDROOMS & BATH & C ABOVE

THE SECOND HOUSE HAS
DRAWING RM & BOUDOIR
IN PLACE OF COMMON RM

FACING
SEA



ELEVATION TOWARDS ROAD

E.B. LAMB, ARCHITECT
LONDON

These two houses stand close to the sea in the bay of Studland, on an eminence about 40ft. above sea-level. They are built of local bricks covered with rough-cast, finished white, with red tiles on the roofs. A very beautiful view is obtained all around the coast to Bournemouth. The houses are almost completed. They have cost about £900 each.

ARCHITECTURAL PARTNERSHIPS.

GENERALLY speaking, architectural partnerships may be classified in one of two ways: the partnership may include two or more men of varying capacities, the work being divided among them so that one man does all the real architecture while the others attend to the business or constructive details; or the partnership may be a simple combination of two or more architects, each following his own bent in a way, but working in harmony and aiding one another by mutual criticisms. As regards the second form of partnership, its desirability is purely a matter of temperament. Some men need backing and friendly endorsement to enable them to do their best, and such a species of co-operative partnership does not imply any lessening of architectural individuality nor any desire to ignore or evade the various and exacting conditions under which architecture is or should be practised to-day. But as regards the first species of partnership, that in which the work is divided and one man does all the designing, another all the construction, and perhaps a third the business or the "hustling," it is or is not justified entirely by the point of view which is taken of architecture as a profession.

We hear a great deal nowadays about specialization, and it is frequently asserted that considering all the advance in electrical engineering, heating work, specialized sanitation, steel construction, quite aside from the complicated problem of the successful manipulation of a large business, it is physically impossible for an architect to understand sufficiently all the details now required of him to be able properly to handle his business alone, and that therefore he must, if he is to be successful, associate himself with specialists as partners. The writer assents to neither the statement of alleged facts nor the conclusion drawn therefrom. The modern problems involved in large building constructions have come into being within a very few years. It is beyond dispute that they found most of the members of the architectural profession unprepared to meet them, and that the requisite architectural training of twenty or twenty-five years ago was quite inadequate to the demands which are made upon the profession of to-day. But to assume that an architect cannot in the course of the years which are usually given to preparatory studies equip himself to properly handle all of the problems with which he will have to deal in the most extensive business, is to assume that he is either deficient in mental endowment or is not willing to work. The engineering problems involved in even the largest architectural construction are, after all, quite elementary. One does not require an engineering education in order easily and intelligently to design a modern steel building, and the mere methods of calculation can be acquired by an intelligent university-bred man in a few weeks. In the same way also the problems of heating and ventilation can be mastered in a relatively short time, while the acquisition of a working knowledge of all that has to do with ordinary electrical work need not consume more than six months of the time spent in preparatory studies by the educated architect. It is not necessary that the architect be an expert electrician, any more than he be an accomplished bricklayer or carpenter. It is essential that he should know what can be done with electricity and how it can be done right, just as he must know when masonry is well laid or when carpentry is successfully put in place; and the same reasoning applies to all of the so-called practical and technical branches of our profession. It goes without saying that these are not the most attractive branches to the man who is

a born designer. They are the parts of his profession which he would most gladly lose sight of or entrust to others, and for that very reason they are the parts upon which he ought to force himself to be posted. This brings us to the real point of the whole objection to a partnership in which the work is divided. Shall we look upon architecture as an art or as a business? If we are to consider it simply as a business there is every reason for dividing the work, for forming an aggregation of partners, so that the designer shall only design and the constructor only construct, and the scientist consider only science; but that is not architecture—that is business pure and simple. A subdivision of work means a greater ease in executing it; it means an economy in production, and a rapidity in carrying out and developing schemes which commends itself entirely from a purely mercenary or mere business standpoint; and if architecture means no more than doing our work with the least possible expenditure of thought and money, of getting our work completed in such manner as will show the largest cash dividends, if it is only a question of increasing the volume of our business and reducing the volume of our expenses, then, by all means, a partnership is the correct and only businesslike procedure. But architecture never has in the past been developed on any such lines. A division of architectural responsibilities means inevitably a one-sided result. It means, furthermore, that in the partnership there is no real architect at all. The designer is bound to lose sight of the practical conditions; and the practical man, the scientist or the business-manager, has absolutely no part in architecture as such, but becomes a mere cog—a very important cog and a very desirable cog, to be sure, but still only a one-sided factor—in the machinery which grinds out something that may pass for architecture and may very often be excellent of its kind, but which has a lowering rather than an elevating tendency, and which is sure in the end to dwarf the individuality of those concerned in it.

Architecture at its best is not a money-making profession. In this respect it is like all arts. The artist is called upon to sacrifice worldly advancement for an ethical idea. The advancement of his profession, the realization of his ideals, ought to be to him far more than mere pecuniary gain. It is pretty hard sometimes to be true to such ideals, to see the modern commercial architect who cares for nothing

quite so much as for large commissions step in and capture the rich plums, while the artist has to content himself with nothing but his ideals. If an architect has not the courage of his convictions, and is not willing to sacrifice for these ideals, it simply means he is not of the stuff of which great designers are made. He is not the kind who is to help, even though silently and obscurely, in lifting his art to a higher position. It need not be assumed from this that the architect who looks upon the profession simply as a money-making business is necessarily a man to be wholly condemned. From an artistic standpoint his point of view is wrong and the architecture which he produces will be based on at least incomplete principles; but his very commercialism may be a stimulus to the architect who holds different if not higher ideals, teaching the latter to make his work more thorough, inciting him to better business methods and showing him what art is not. But the real question of whether an architectural partnership with divided responsibility is right or wrong can be settled wholly from the standpoint of whether a man goes into architecture primarily to make money or whether he goes into it primarily to do the best work he can possibly accomplish. The expediency of such a partnership from a financial standpoint is indisputable. Its necessity from an artistic standpoint is absolutely denied. If the architect really has the creative spirit, if he has it in him to be all that the word architect might imply, it is no one's fault but his own if he is unable to handle all of his work alone. There are plenty of opportunities for study; it is not impossible for him to keep easily abreast of scientific growth and structural development, and the very fact that he will have to work hard to keep up with the times will help him to make his work well rounded and comprehensive and more truly fitted for its purpose. Architecture which is mere designing is often as one-sided and false as the so-called architecture which is mere construction. Book-keepers, superintendents and specialists in every department can always be had for the asking, and can be used intelligently so long as the architect knows thoroughly what he wants, but the moment he resigns any one portion of his work wholly to someone else, whether it be the artistic, the practical or the business side, he by so much deprives himself of just right to the title of architect and to a corresponding extent he imperils the full measure of



College at
Gough Park,
Enfield
for
P. C. Bowles Esq.
S. W. G. Gough, Archt.
1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 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2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 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the real architectural success. A partnership which is an association of two architects working together, mutually encouraging one another, in sympathy with one another's aims and endeavours, is quite another affair, but the partnership in which a man deliberately relinquishes an essential part of his profession can be justified only when architecture is considered a mere means of earning money. X.

Construction Notes.

Mediaeval Building.

Recent antiquarian investigation on the site of Builth Castle, in Breconshire, has shown that in constructing the walls the old builders used the method of "grouting" which is to be found in many of the old Norman castles. This construction is also well shown at Caerphilly Castle. The method was to erect facing walls and pour between them a conglomerate composed of rubble, pebbles and cement; this is well known to students of both Roman and mediaeval architecture, though the method is little followed to-day, having been displaced by that of a brick backing. The construction of walls in this fashion is serviceable enough and offers economic advantages which make the method worthy of adoption in many localities for special work. Thus where a stone face is required on each side of a wall, as in a church, brick backing would be displaced. To make this kind of building strong and lasting the essential points to be observed are that the stone facing-blocks are worked to a smooth bed for a certain distance from the face so as not to spall; that they are properly bonded; and that they are left rough and jagged in the wall in order to give a good hold for the conglomerate, which must have a strong cement for the matrix; and finally to fill in and level off the conglomerate at each course all round the site and not build up the facing stones to any height (so as to avoid them bulging out when the conglomerate is poured in) nor to build up any portion higher than another. If through stones were occasionally inserted they would help to bond the faces together. Lime of weak hydraulicity, often fat, was used in the old work, and for this reason many of these ancient buildings are distinctly badly built; it has proved the ruin of many examples and a constant source of weakness to others; but where we have such an excellent cement as Portland there is no reason to be afraid to build in this way. Another interesting discovery at Builth Castle was the trace of trackways between certain points, shown by layers of pavement that had been formed of laminated stone of the neighbourhood. The trackways used for cartage of materials by the builders have been traced in many ancient churches, cathedrals and castles, and the investigation often leads to important conclusions as to the chronology of the building, the time taken to erect it, and the difference in date of various portions. Thus it may be found that some bays of a nave arcade have a difference in their mouldings to the others, and when the matter is investigated it is concluded that these are of later date by reason of their being left unbuilt for some years to allow of a roadway for cartage of materials into the building, and when built the difference in the ideals and training of a fresh generation of workers was reflected in the detail. Students should look for such points and endeavour to trace the whole history of a building, regarding it not as if produced by the kind dispensation of Providence, but as the outcome of the common-sense solution of problems very much like our own by ordinary human beings very much like ourselves. From the study of what might be called "the contracting methods" and

construction of the mediæval builders will be derived the training for the architect as distinct from the mere archæologist.

Bundling Slating Battens.

A TIMELY complaint is addressed to shippers by "Timber" on the subject of the bundling of slating battens, which is a source of continual irritation both to the buyer and seller. It is the custom of most shippers to tie the bundles with string at each end, in the same manner as they bundle plasterers' laths and palings, but they seem to forget that in the case of slating battens averaging 10ft., 11ft. and even 12ft. long the strain is very much greater, and in the majority of cases the string is not sufficiently strong to stand the inevitable rough usage during loading and discharging, not to speak of the friction caused by the bundles rubbing against each other during rough weather on the voyage. In the ship's hold the string is often nearly worn through before the goods have been touched on this side, and after the not too gentle handling of the stevedores the number of broken bundles is very considerable. Shippers naturally find claims on this account very annoying, as they have probably seen the goods well and securely bundled at the loading place, and many of them dispute their liability, saying that the ship is responsible for the rough usage. On their part, shipowners naturally contend that a certain amount of rough usage is unavoidable in loading and discharging of wood cargoes, and that if the string used for bundling is not sufficiently strong to stand this the fault does not lie with them. To guard themselves against claims, brokers frequently insert in charter parties a clause "not responsible for broken bundles," and in these cases a buyer receiving broken bundles and making a claim is in an awkward position. The best way out of the difficulty is for shippers to use stronger string—tarred string is the best—or else give an extra tie in the middle of the bundles, which would probably be quite sufficient.

Peat Building Blocks.

A RECENT report from United States Consul General F. H. Mason, residing at Berlin, says that "heloxyle" is the name given to peat fibre compressed and hardened by a special process into sheets, tiles, plates and blocks for various building purposes. It has about the consistency and specific gravity of sound cork, and being a non-conductor of heat, moisture, sound and vibration it is of value in localities where warmth, dryness and protection from noise or jar are especially desired in dwellings and other constructions. It is impregnated with some material which renders it practically incombustible. It is used for lining walls, ceilings, window- and door-frames, to underlay wooden flooring, and even as flooring itself.

Slates.

THE collapse in the price of Carnarvon slates which has so suddenly taken place was by no means anticipated or thought probable by the proprietors themselves until a much later period of the present year: $7\frac{1}{2}$ per cent. is a drop calculated to excite discontent on the part of those merchants who, having accepted the assurances of the proprietors only a few weeks ago that no such fall was possible until the end of the year, continued to place their orders and accumulated stocks. To dispose of such accumulated stocks in face of this fall in price will mean an inevitable loss to the merchant, who will doubtless look for a proportionate rebate to the quarries supplying him. The make of slates for 1903 shows an increase, as compared with 1902, of 5,000 tons from slate mines (or underground quarries) and 10,000 tons from open quarries. This is, however, 26,000 tons below the

average output of the last ten years. The demand for slates of good quality is brisk, and the increased output will displace an equivalent tonnage of foreign slates.

Irish Cement. THERE is a prospect of the cement trade in Ireland expanding. The engineer of Limerick Harbour has submitted to his board the result of the analyses made recently by two experts of the Department of Agriculture of samples of alluvial deposit in or near the Shannon, and also of the limestone in various parts of the neighbourhood, with a view to ascertaining whether the materials were suitable for the manufacture of cement. The report was very favourable in showing that the industry could be started close to the city. The board regarded the report with much satisfaction and directed the engineer to make enquiries as to the probable cost of the manufacture of cement in Limerick. We have often called attention to the wealth of Ireland's mineral resources, and there is no legitimate reason why England should continue to supply general building materials to that impoverished country.

TWO-TIER THEATRES.

IT is Mr. W. G. R. Sprague's opinion that the two-tier theatre has many advantages over the three-tier building. This may be true where the depth of the house (*i.e.* the distance from curtain line to circle front) is very small. The gradients to the circles are less and, generally speaking, there is a greater comfort for the audience owing specially to the reduction of staircases; and the patrons of the gallery benefit because they have a better view of the stage than in the "well" theatre. The Waldorf, which is being erected in Aldwych, will probably be the last three-tier house to be built in London. The auditorium will be semi-circular instead of the customary horseshoe form. Plans have also been prepared for another theatre in Aldwych in the same block as the Waldorf, and separated from it by the Waldorf Hotel. Mr. Seymour Hicks's new theatre will be in Shaftesbury Avenue, almost opposite the Trocadero Restaurant. This will be a cosy house of two tiers, and will be luxuriously furnished. Another addition will be a large variety theatre in Tottenham Court Road, to accommodate about 2,500 persons. Mr. Sprague is also designing this.

Stanley Brothers, Ltd.—A circular has been issued by the directors of Stanley Brothers, Ltd., brickmakers, Nuneaton, stating that the capital is to be increased to £300,000 by the creation of 9,000 £10 shares.

A Skyscraper blown down.—In the great tornado which struck the State of Minnesota, U.S.A., last Saturday, and did damage to the extent of £500,000 in St. Paul and Minneapolis, a "skyscraper" building in the latter city, occupied by flat-dwellers, was blown down, and over 200 persons are reported to have been killed in the collapse.

A Bridge collapses at Lower Edmonton.—The Great Eastern Railway Company are employing Messrs. Butler & Co.'s Trustees, Stanningley Iron Works, Leeds, to build a bridge over the railway in connection with a new short road in course of construction from Montague Road to the Edmonton Urban District Council sewage farm. Four arches had already been raised in skeleton, flanking the railway, and the bridge over the line itself was only commenced last Monday week. The foundations were laid, the centering erected, and the bridge temporarily slung across, when the whole structure gave way, flinging tons of iron and timber debris across the track, blocking it up for four hours. Seven men were injured.

OUR PLATES.

A DETAILED description of the King's Sanatorium now being erected at Midhurst from the designs of Mr. H. Percy Adams, F.R.I.B.A., will be found in our issue for November 25th, 1903, when plans and perspectives were also given. The sanatorium will comprise two distinct blocks, namely, the administration building and the patients' block, connected with one another by a corridor. The buildings will be of red bricks, relieved with stone here and there. The roofs will be covered with red tiles.—The house at Wolves Newton, Monmouthshire, is the residence of Mr. H. J. Simpson, and is built of Tintern Abbey stone, covered with white rough-cast. The roofs are of red Bridgewater tiles and the chimneys and other portions are in Forest of Dean grey stone. Oak is used generally externally and in all the best rooms, the hall being treated with a massive stone fireplace with high oak panelling having a stone wide-jointed frieze with bronze ornaments. This house overlooks a magnificent view towards Abergavenny. The architect was Mr. A. Jessop Hardwick, of Kingston-on-Thames, and the builders were Messrs. E. Turner & Sons, of Cardiff. The electric lighting and fittings of the house, stables and other buildings on the estate were by Messrs. Alger & Sons, of Newport. The drawing reproduced was hung at this year's Royal Academy exhibition.

Obituary.

Mr. W. T. Liddiard, twenty-eight, architect, of Acton, recently cut his throat after being arrested on a warrant for alleged forgery. The jury returned a verdict of "suicide whilst temporarily insane."

Mr. Thomas Wellman, a builder and contractor in a large way of business at Bristol, recently committed suicide. He belonged to an old Dorchester family, and his father was

a well-known county contractor for many years.

Mr. E. A. Lansdowne, architect, of the firm of Messrs. Lansdowne & Griggs, Newport, Mon., died recently. He went to Newport from Bath more than thirty years ago, and among the many buildings erected from his designs is the town hall and the Westgate Hotel, besides the mansion of Mr. John Cory at the Duffryn, St. Nicholas, and the mansion of Mr. Herbert B. Cory, known as Druidstone, St. Mellons, near Cardiff.

Enquiries Answered

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Open Space around House.

LANCASTER writes: "An addition is proposed to be made to a building at the corner of two roads. The local authority say there is insufficient air-space. The section of the by-laws concerned reads as follows: 'Every building built or rebuilt shall have at the back or side thereof and immediately adjacent thereto and exclusively occupied therewith a yard or area of not less than one half the area of such building, &c., &c.' The point in contention is as to whether the whole of the space coloured blue on the accompanying plan (not reproduced) can be measured as yard or area under the by-laws, as being at the side of the building, or only so much of the space as is behind the building line. It is argued that the elevation in which the main entrance is placed is the front of the building and the other three elevations are respectively sides and back. I shall be glad if you can refer me to any authoritative decision on the matter."

I fear the authorities are legally correct in stating that no land lying in front of the

building line (you do not show the adjoining properties, but I conclude that your building is on the general building line) either in Darley Road or in Swinton Road can be calculated as "open space" for the purposes of the by-law you quote. By *Warren v. Mustard* in 1891 (T.L.R., Q.B.D., vol. viii., p. 65) and by *Leyten Local Board v. Causton* in 1893 (T.L.R., Q.B.D., vol. ix., p. 180) it has been laid down that a corner house must conform with the building lines in both streets, in accordance with the Public Health (Building in Streets) Act, 1888. It follows, then, that the land lying between each building line and each street is situated "in front" and not at the "side or rear" of the premises.

F. S. I.

Societies for the Preservation of Old Buildings, &c.

LONDON.—M. F. writes: "Please give me the names and addresses of any societies having for their object the preservation of ancient buildings, open spaces, gardens, &c.; photographing and depicting interesting old buildings in London and suburbs; architectural vigilance societies in London, preservation of City churches (London) and any others of a kindred nature."

The Society for the Protection of Ancient Buildings (Mr. Thackeray Turner, secretary, 10, Buckingham Street, Strand); National Trust for Places of Historic Interest or National Beauty (Mr. Nigel Bond, B.A., secretary, 25, Victoria Street, S.W.); Metropolitan Public Gardens Association (Mr. Basil Holmes, secretary, 83, Lancaster Gate, W.); the Architectural Vigilance Society (Mr. H. H. Statham, hon. secretary, 9, Conduit Street, W.); City Churches Preservation Society (Mr. Alfred Moore, hon. secretary, 7, Leadenhall Street, E.C.).

Concert Hall Acoustics.

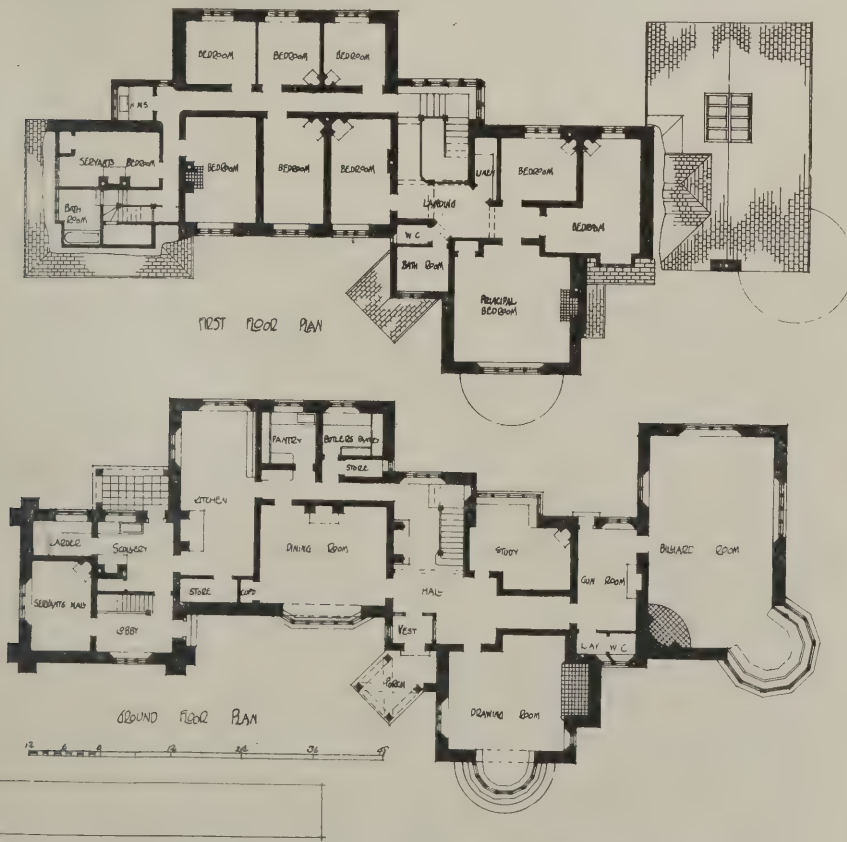
Referring to the enquiry on this subject answered in our issue for last week, W. K. B., of Manchester, writes: "As a fine example of acoustic success I would name the Free Trade Hall, Manchester. It is galleried on the sides and end, and the ceiling is flat in the centre and curved at outer angles. The hall measures 123ft. 6in. by 71ft. 1in. and is 52ft. high. A singular point may be noted, namely, that the width added to the height equals the length, or thereabouts. Other readers may help by sending other successful cases, or the sizes of unsuccessful might put us on our guard."

Water-Supply to Farmhouse.

HEREFORDSHIRE.—H. A. B. writes: "I am about to provide a water-supply to a farmhouse. The water is 410yds. distant from the house, from which there is a fall of 10ft. to the spring. It is proposed to put a 3½in. pump in the house and a 1½in. galvanized iron pipe from same to the water. Will this work well and fairly easily, or can any improvement be suggested? Also midway between the spring and the house it is proposed to fix a pump to supply some cottages. Will it do to take a branch from the above pipe for this purpose or must an independent pipe be laid?"

Your arrangement is not a desirable one, as not only is the length of the suction too great, but by the arrangement of two pumps on one pipe you render the upper pump liable to be put out of action by a defect in the lower one. You would do well to put in a force pump at the source of supply and by placing a stop-cock on the branch pipe leading to the cottages this pump may be made to deliver to service tanks in the roofs of both buildings. If, however, there is a fall from the spring and a fairly good supply of water, you would do much better to fix a ram instead of a pump, as this would be automatic in action and much less costly than a pump, both in itself and in the size of rising main required.

F. S. I.



HOUSE AT WOLVES NEWTON, MONMOUTHSHIRE. A. JESSOP HARDWICK, ARCHITECT.

Keystones.

Brixton Gaol is being enlarged by the addition of a wing to accommodate 400 prisoners. The enlargement has been partly rendered necessary by the demolition of Newgate.

Queen Victoria Memorial.—About 200 workmen are now engaged on the work of altering the railings and forecourt at Buckingham Palace in connection with the scheme for the Queen Victoria Memorial.

The first portion of the **Middlesex Light Railways**, running between Tottenham and Wood Green, *via* Bruce Grove and Lordship Lane, was formally opened for public traffic on Saturday.

The **G.P.O.** spent £400,000 on buildings, new and old, during their last official year. They acquired nearly the whole site of the old Christ's Hospital buildings for new sorting offices—nearly $3\frac{1}{2}$ acres in the heart of the City of London.

The new **School for University College** is to be erected on a site at the junction of Frognal and Arkwright Roads, Hampstead. The main building will accommodate 450 boys and will be planned to admit of extension by classrooms for an additional 150 boys, or 600 in all. The estimated cost is £50,000.

Competition for Chapel and School at Brighouse.—Mr. W. S. Braithwaite, of Leeds, Messrs. J. Wills & Sons, of Derby, and Messrs. A. H. Goodall & Son, of Nottingham, were recently invited to submit designs for a new M.N.C. chapel and school at Brighouse. The committee have decided in favour of Messrs. Wills & Sons.

Stockport's New Town Hall.—The foundation stone of this building is to be laid on September 24th. Mr. Bramwell Thomas is the architect, his design having been accepted in competition recently. The accepted tender of Mr. Pownall is £54,496 for the work to be done in Portland stone and £53,766 in Crossland Hill stone.

St. Chad's Cathedral, Birmingham, erected from the designs of the elder Pugin, is being restored at a cost of some thousands of pounds. The brass-work in the edifice will be renewed, the mullions in the south transept window replaced, and an electric-light installation introduced, besides considerable structural repairs. The cathedral will be reopened on Sunday, September 25th.

Royal Albert Memorial College, Exeter.—The Corporation of Exeter have agreed that application shall be made to the Local Government Board for a loan in respect of the proposed extensive additions to this building, for which plans, &c., are to be prepared by Messrs. Tait & Harvey, of Exeter, for the approval of the Board of Education and the Local Government Board.

Liège International Exhibition.—An art exhibition is to be arranged at the Universal and International Exhibition to be held in Liège in 1905. Full particulars as to the conditions for exhibits, which will include paintings, sculpture, engravings and architectural designs, are given in the official regulations, which can be obtained on application to the Consul-General for Belgium, 29, Great St. Helen's, E.C.

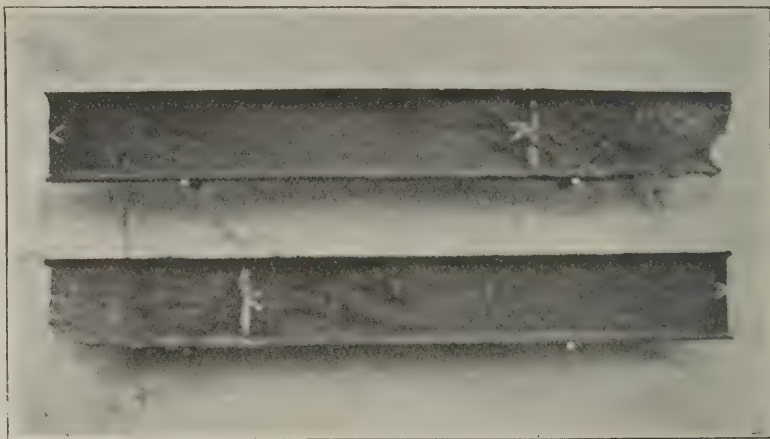
Architectural Scholarships in Canada.—The Province of Quebec Association of Architects has founded a scholarship which guarantees to the winner a four years' course of study for the degree of Bachelor of Architecture at McGill University in Montreal. The scholarship is open to the competition of natives of Canada who have been employed in the office of any member of the Association, provided they have passed the Association's preliminary examination and the University's entrance examination.

FIREPROOF BRICK PARTITIONS.

DESPITE the many new materials for fire-resisting partitions which have been introduced, that time-honoured servant brick has not been displaced. It is true that the use of clay for fire-resisting purposes has not been absolutely satisfactory in certain cases—such as for casing steel joists—but that has been more ascribable to defects in design rather than deficiencies in the material itself. For partitions, however, clay is admirable in every respect. It is usually moulded in the form of hollow blocks, this being dictated by the desire to reduce the weight and afford resistance to the conduction of sound; in addition, sawdust is mixed with the earth, thus reducing the specific gravity and therefore the weight, preventing warping, and increasing the porosity, so that nails or screws may be driven in without splintering the blocks (in fact, solid bricks made with sawdust are largely made for fixing bricks) and allowing them to be cut with a saw. But with all the many fire-resisting materials on the market, it appears to have been left to the Hempstead Patent Brick Co., of Hemel Hempstead, Herts, to claim (and be able to substantiate) to have produced an absolutely fireproof partition block. Of course everything depends upon the composition of the material used, for under very

temperatures better than most firebricks—indeed, bricks made from the clay have been used to build the kilns at the works together with fireclay bricks, and whereas the latter have in some cases fused the Hempstead clay has not suffered the slightest damage.

The Hempstead partition blocks are made in the usual hollow shape with one, two, or three longitudinal compartments, according to the size of the block, with the admixture of hardwood sawdust to the clay before it passes through the press, this sawdust being consumed in the burning, thus leaving the brick porous. There is one innovation in these blocks which is to be specially noted, namely, grooves are formed over the face to give a key for the plaster, and also on the beds (in this latter case with jagged edges so as to afford a still further key) for the mortar, though the porosity and texture of the surface is sufficient to give a good hold for plaster. The blocks are laid just like ordinary bricks, and the largest size blocks made are easily handled, being of no great weight, and spanned by the hand; the mortar is spread on the beds and wiped on the ends of the blocks, as when laying ordinary bricks, but it enters in the longitudinal cavities and so interlocks the blocks against lateral stress, which the grooves on the beds are also designed to assist. The result is a partition of greater strength and stability than those with grooved edges and other



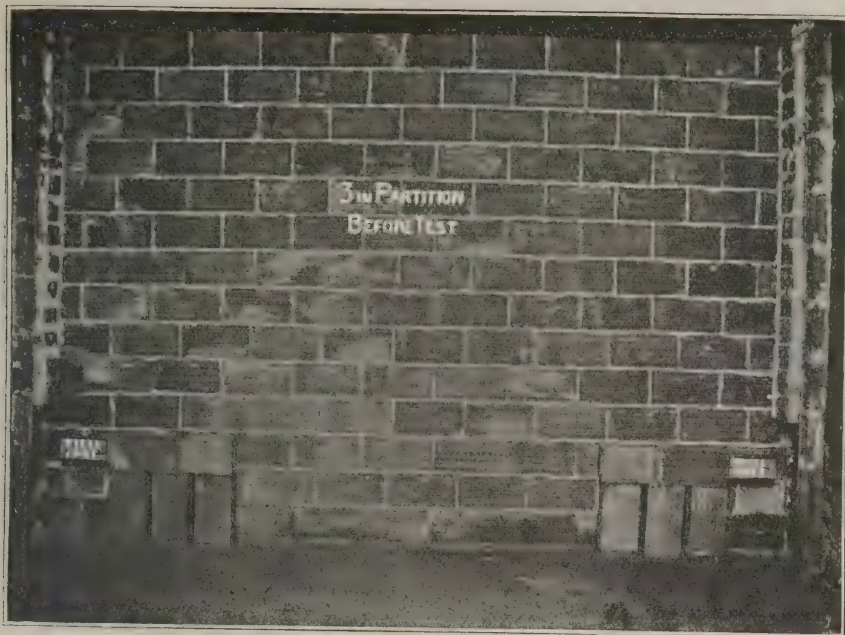
CONDITION OF JOISTS AFTER FIRE TEST, SHOWING EXPOSED ENDS AND PORTIONS PROTECTED BY PARTITION BLOCKS.

great heat nearly every ordinary material—brick, stone, granite, cement, lime, gypsum—will fuse, crumble to powder, or twist, crack and warp, in a manner which clearly points to the destruction of a building under such temperatures as are known to have been reached in large fires like that at Baltimore and on the Cripplegate area. The usual fire tests are very well in their way, but only conclusive as regards resistance up to a certain point; the conditions under which they are conducted are not so severe as an actual fire, though generally considered sufficient for all practical purposes; but an actual fireproof material has additional advantages which, when obtained without extra cost on the ordinary partition brick, make its use very desirable. A really fireproof material means that all spread of fire due to the breaking down of resisting barriers by flames is prevented, and that instead of having to pull down any standing walls and rebuild them, they can be retained and just replastered and repapered. The great resistance of the Hempstead partition blocks is due to the peculiar nature of the clay. This is of the variety known as ganister clay, and contains a large quantity of iron, which gives a fine bright red colour when burnt that deceives one as to its great refractory power; it in no wise betrays the very remarkable fact that the bricks resist high tem-

peratures better than most firebricks—indeed, bricks made from the clay have been used to build the kilns at the works together with fireclay bricks, and whereas the latter have in some cases fused the Hempstead clay has not suffered the slightest damage.

The practice of inserting metal tongues or rods to gain this stability is avoided. The Hempstead blocks are made in various sizes, namely, of standard dimensions, and either $2\frac{1}{2}$ in., 3 in., $3\frac{1}{2}$ in., 4 in. or $4\frac{1}{2}$ in. thick, which can be built into walls to serve as fixing bricks for door-frames, &c., and of the following face sizes, 12 in. by 6 in., and 12 in. by 9 in., with a thickness of 2 in., $2\frac{1}{2}$ in., 3 in., $3\frac{1}{2}$ in., 4 in. and $4\frac{1}{2}$ in., weighing respectively for 12 in. by 6 in., 94 lbs., 110 lbs., 130 lbs., 145 lbs., 165 lbs. and 195 lbs. per yd. super., and for 12 in. by 9 in., 90 lbs., 105 lbs., 126 lbs., 140 lbs., 160 lbs. and 192 lbs. per yd. super. The price of the bricks ranges from 50s. to 85s. per 1,000. The 12 in. by 6 in. blocks work out at 1s. 10d. per yd. super. for the first three thicknesses, and 2s., 2s. 2d. and 2s. 4d. for the next sizes, while the 12 in. by 9 in. are 2s. for the first three and 2s. 2d., 2s. 4d., and 2s. 6d. for the others.

A special test with these partition blocks was recently made for our particular benefit, and is here illustrated. Two partitions about 1 ft. by 8 ft. high, one of blocks 3 in. thick and the other of $4\frac{1}{2}$ in. blocks, were erected in a brick-built kiln at the firm's works, stretching from side to side between the fire-holes, and having a space of about 9 in. between them. The top was enclosed with 3 in. blocks and two chimneys



built up through the roof of the kiln. Close to the fire-holes on each side short pieces of steel joists were placed inside the partitions, as shown in the photograph taken before the test, a portion of their length being enclosed by blocks of the company's manufacture. The object of the test was (1) to show that at a temperature high enough to melt steel the bricks were uninjured, and (2) that they protected the steel. The fires were lighted at 12 a.m. on the previous day, and kept going gently until about 12 a.m. on the day of the test, when they were fully stoked up, and by 4.50 p.m. were at white heat, which continued up to 8 p.m. Very few cracks developed during the test and these were merely surface ones; they were mostly directly under the chimneys standing on the partitions, suggesting that they were due to the expansion caused by the heat and the prevention of free play by reason of their confinement by the roof, but it was remarkable how small was the expansion in this and previous tests, for when cool hardly any contraction was noticeable. This is a most important feature, for otherwise the partition confined by the walls, ceiling or floor would be strained to failure. Notwithstanding the enormous heat inside, the outside of the

partitions, though hot, was not sufficiently so to cause the head of a wax vesta to take fire.

The result of the test is shown by the photographs we reproduce. The pieces of steel joist, it will be seen, were partially melted, showing that a temperature of over 2,700 degs. Fahr. was reached, and yet the blocks were uninjured, except for one cracked by reason of too tightly fitting the joist, which expanded. They protected the steel so far as they covered it.

The sudden application of water to the heated surface causes no injury to the blocks. On one occasion this company subjected several of the well-known fire-resisting partition materials to a test of this kind, and they all failed by fusing, twisting, cracking or powdering. These new partition blocks are being used largely. They have been adopted by the London County Council and are being used at the new Gaiety Restaurant in the Strand. The credit of the manufacture of this valuable fireproof material is due to Mr. Alexander Swinney, the managing partner, a brickworks expert and engineer of wide and long experience, to whom we are indebted for freely explaining and showing us the whole process of manufacture. The

clay is of peculiar nature and dries so slowly that it is impossible to use a wash-mill commercially; there are practically no flints in it; and it can be taken straight from the bank to the pug-mill and moulding machines. Mr. Swinney's knowledge enabled him to mould the clay without causing lamination and to carry out the drying of it so as to ensure sound bricks and blocks.

Builders' Notes.

Another Fire Test with Uralite was conducted in Crown Street, Liverpool, on Monday.

The Additions to the General Hospital, Merthyr Tydfil, are being warmed and ventilated by means of Shorland's patent Manchester stoves, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

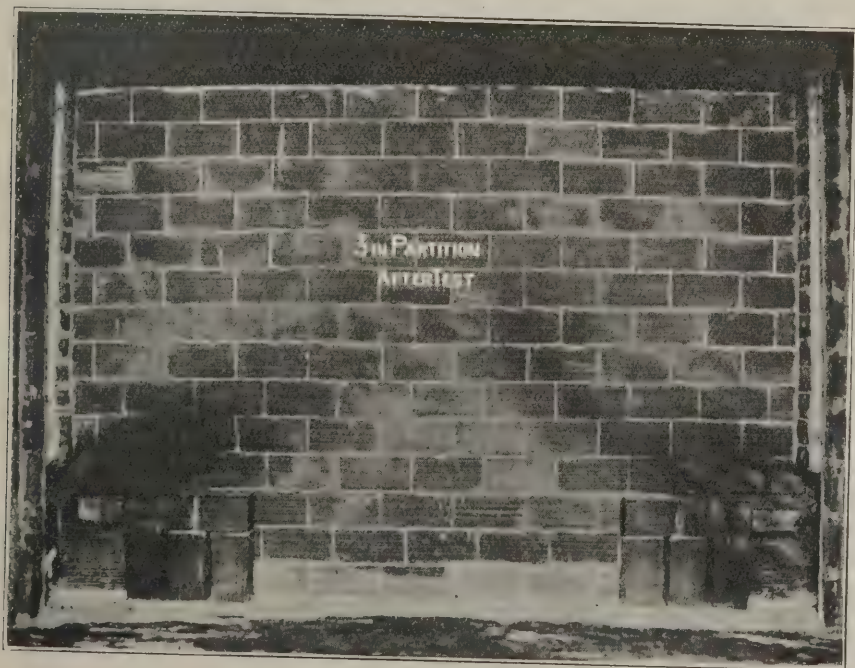
At the Trades Union Congress to be held at Leeds next month a resolution will be put forward by the bricklayers "that the qualification for representation on the Labour Representation Committee should be the same as at the Trades Union Congress."

London Wells giving out.—The wells of the metropolis are giving out, says Mr. T. H. W. Idris, one of the representatives of the London County Council on the Water Board. "We are going down more than 1ft. per year, and in the neighbourhood of the Hop Exchange the wells have become shallower by 35ft. during the last ten years. It is the same in Essex, and it is also true of Kent."

Walter Scott, Ltd.—The report for the year ended June 30th last, to be presented at the meeting on August 29th, at Newcastle-on-Tyne, states that the gross profits of the steel works, collieries, brick and cement works, &c., for the twelve months amount to £51,430, to which must be added the balance brought forward from last account, £6,383, making £57,813. There has been carried to special reserve account, including interest, £8,229, and the directors recommend a dividend of 2½ per cent. on the ordinary shares for the half-year to June 30th, 1904, making with the interim dividend 5 per cent. for the year, carrying forward £3,334.

New York Building Strike.—The struggle between the masters and employees in the building trade of New York has become more acute and work has stopped on most of the large buildings being erected in New York City. The employers' association have threatened to put an end to the agreement arrived at by arbitration last year if the strike continues. The men's unions have called out a large number of men. The employers now state that hereafter they will not recognize the unions, but throw their shops open to unionists and non-unionists alike. There are still eight building unions whose men have not been ordered to strike, but it is expected that the disaffection will spread to them, and when their members are ordered out operations will cease on more 80 per cent. of all buildings being erected in New York. Over 100,000 employees will be affected.

Another Large Mission Hall.—The work of erecting a hall for the accommodation of those who will attend the Torrey-Alexander Mission in Cardiff in October has been commenced in the Cathays Park. The hall is to be constructed largely of steel, the roofs being covered internally with galvanized sheet iron and externally with weatherboarding, to which the decorator will give the semblance of red tiles. The building itself will cover a floor area of 30,000ft., and will be in three spans, each 60ft. in width. Ample accommodation will be provided for a choir of 600 voices; also for committee rooms, &c. The hall is to be lighted throughout by electricity, and will be provided with



adequate patent fire-extinguishing hydrants. It is to have seating accommodation for 7,000, and sufficient exits will be provided so that if necessary it could be emptied in three or four minutes. The contractors are Messrs. Humphreys, Ltd., of London, S.W., who will carry out the work under the supervision of the architect, Mr. W. Beddoe Rees, A.R.I.B.A., Cardiff.

An Old Fleet Quay.—Excavations on the north side of Fleet Lane, at the point where it joins Farringdon Street, have exposed some ancient camp-sheeting composed of oak piles and platform, with stone supports. The wood, notwithstanding its years of immersion in water and damp soil, was in excellent condition; whilst the mass of stone, brick and lime was so solid as to necessitate considerable work to remove it. This quay, from its situation, was no doubt an ancient wharf, where the barges and shippers used to discharge, afterwards loading smaller boats and proceeding up the creek now represented by Fleet Lane. The wood has been removed with the rubbish, and the spot concreted over ready for the foundation of the new buildings that are being erected on the site. The progress of the work of excavation has been delayed by the quantity of water that has poured into the trenches, and, curiously enough, this water is described as being as clear as crystal, and without a suspicion of sewage contamination—this too, at a depth of only 23ft. from the pavement.

Current Market Prices

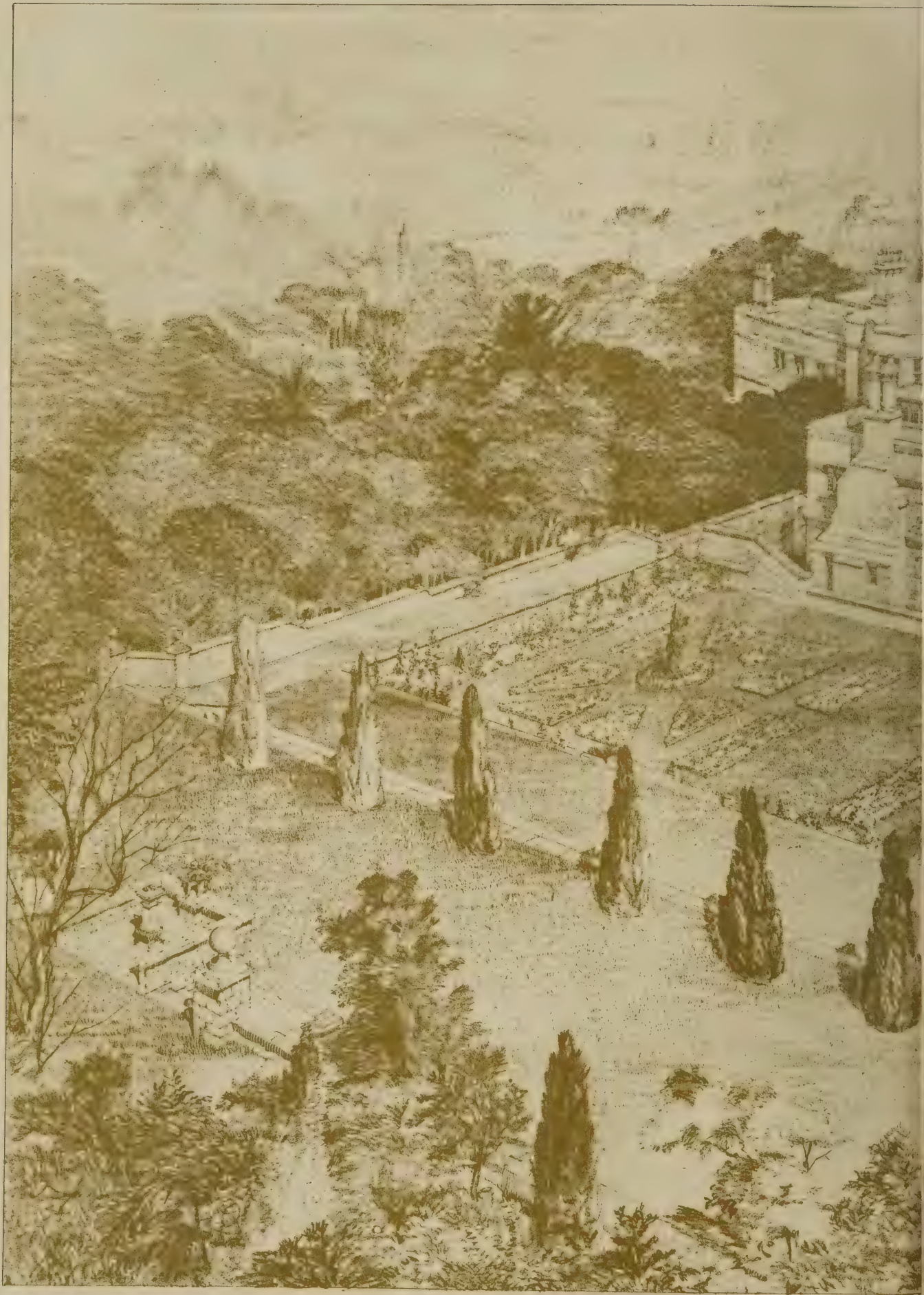
		£	s.	d.	£	s.	d.
FORAGE.							
Beans	per qr.	1	14	0	2	0	0
Clover, best ..	per load	3	15	0	4	2	6
Hay, good ..	do.	3	10	0	3	15	0
Sainfoin mixture ..	do.	3	10	0	3	17	6
Straw	do.	1	12	0	2	2	0
OILS AND PAINTS.							
Castor Oil, French ..	per cwt.	1	0	5	—	—	—
Colza Oil, English ..	do.	1	2	6	—	—	—
Copperas	per ton	2	0	0	—	—	—
Lard Oil	per cwt.	2	15	0	2	17	0
Lead, white, ground, carbonate ..	do.	1	4	10	—	—	—
Do. red	do.	1	0	44	—	—	—
Linseed Oil, barrels ..	do.	0	17	4½	—	—	—
Petroleum, American ..	per gal.	0	0	5½	—	—	—
Do. Russian	do.	0	0	5½	0	0	5½
Pitch	per barrel	0	8	0	—	—	—
Shellac, orange ..	per cwt.	10	9	0	10	11	0
Soda, crystals ..	per ton	3	2	6	3	5	0
Tallow, Town ..	per cwt.	1	3	6	1	4	0
Tar, Stockholm ..	per barrel	1	1	0	—	—	—
Turpentine	per cwt.	2	1	4½	—	—	—
METALS.							
Copper, sheet, strong ..	per ton	70	0	0	—	—	—
Iron, Staffs., bar ..	do.	5	12	6	8	0	0
Do. Galvanised Corrugated sheet ..	do.	10	0	0	10	5	0
Lead, pig, Soft Foreign ..	do.	11	17	6	—	—	—
Do. do. English common brands ..	do.	12	2	6	—	—	—
Do. sheet English 3lb. per sq. ft. and upwards ..	do.	14	0	0	—	—	—
Do. pipe	do.	15	0	0	—	—	—
Nails, cut clasp, 3in. to 6in. ..	do.	9	5	0	—	—	—
Do. floor brads ..	do.	9	0	0	—	—	—
Steel, Staffs., Girders and Angles ..	do.	5	15	0	6	5	0
Do. do. Mild bars ..	do.	6	0	0	6	5	0
Tin, Foreign	do.	122	7	6	122	17	6
Do. English ingots ..	do.	124	10	0	125	10	0

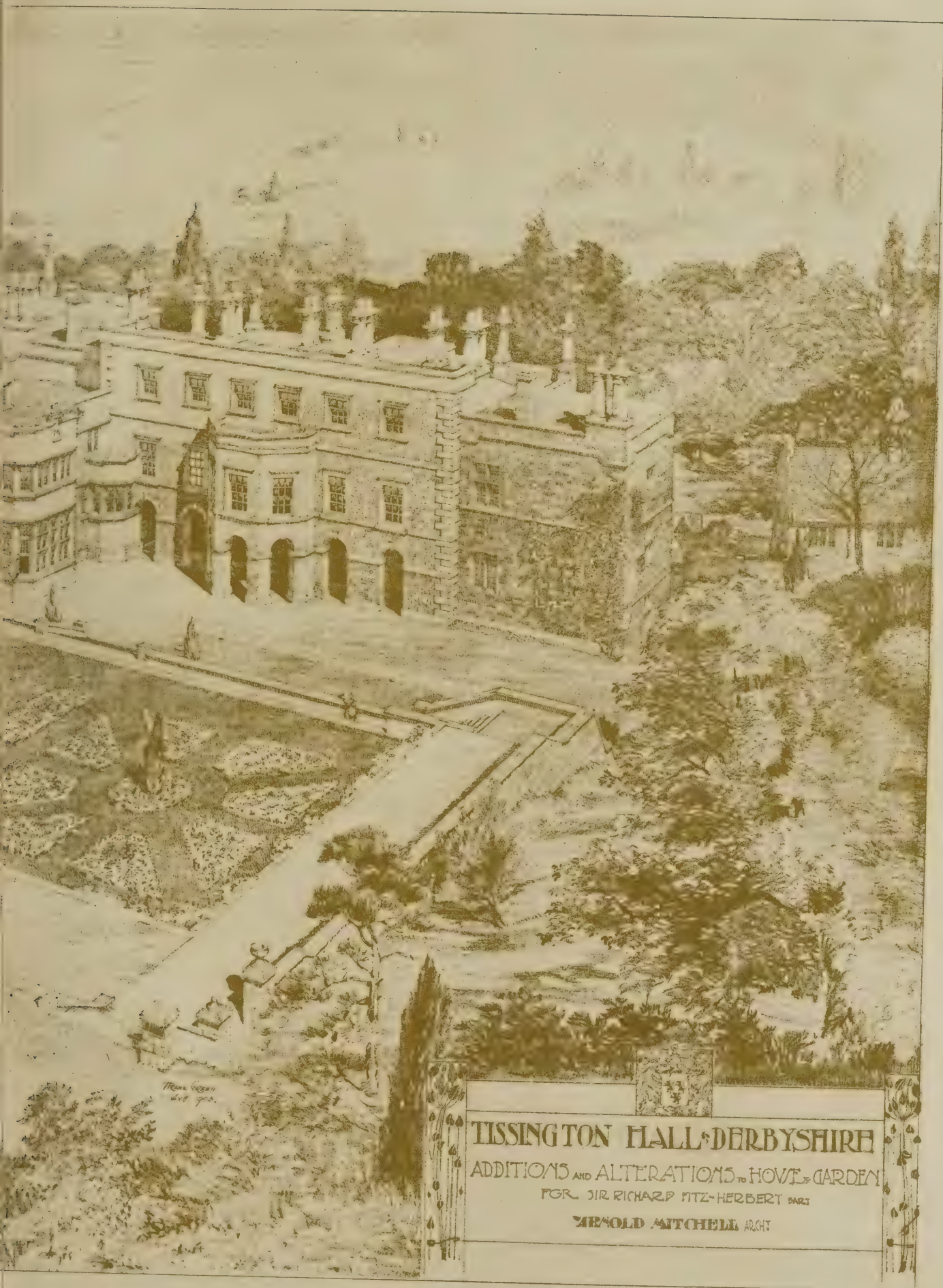
Zinc, sheets, Silesian ..	per ton	£	s.	d.	£	s.	d.
Do. do. Vieille Montagne ..	do.	44	15	0	—	—	—
Do. Spelter	do.	25	0	0	—	—	—
TIMBER.							
Soft Woods							
Fir, Dantzic and Memel ..	per load	1	0	0	5	5	0
Pine, Quebec, Yellow ..	do.	4	0	0	0	1	0
Do. Pitch	do.	4	8	0	5	15	0
Laths, log, Dantzic ..	per cu. fath.	4	0	0	6	0	0
Do. Norrköping ..	per bundle	0	0	7½	—	—	—
Deals, Wyburg, Yellow, 1st & 2nd, 2½ x 7 ..	per std.	7	15	0	8	0	0
Do. Petschora, Yellow, 3rd, 3 x 11 ..	do.	8	15	0	9	0	0
Do. Skelleftea, Yellow, 5th, 3 x 9 ..	do.	7	0	0	—	—	—
Do. Archangel, Yellow, Unsorted, 3 x 9 ..	do.	9	5	0	9	10	0
Do. do. do. do. 3 x 8 ..	do.	8	10	0	—	—	—
Do. do. do. do. 3 x 7 ..	do.	7	15	0	8	0	0
Do. do. do. do. 3rd, 3 x 11 ..	do.	9	5	0	—	—	—
Do. do. do. do. 3 x 9 ..	do.	10	5	0	10	10	0
Do. Skutskar, Yellow, 4th, 3 x 8 ..	do.	9	5	0	—	—	—
Do. Libau, Yellow, Unsorted, 2½ x 7½ ..	do.	7	10	0	—	—	—
Do. Montreal, Spruce, 2nd, 3 x 9 ..	do.	9	5	0	—	—	—
Do. do. do. do. 3rd, 3 x 9 ..	do.	8	15	0	—	—	—
Do. do. do. do. 3 x 8 ..	do.	7	10	0	—	—	—
Battens, all kinds ..	do.	6	15	0	8	10	0
Scantlings	do.	6	10	0	9	15	0
Flooring Boards in prepared, 1st ..							
Do. 2nd	per square	0	9	0	0	11	0
Do. 3rd, &c.	do.	0	8	6	0	10	3
HARD WOODS							
Ash, Quebec	per load	4	5	0	7	0	0
Birch, Miramichi, Planks, 3 x 5 to 16in. ..	per cu. ft.	0	0	11½	—	—	—
Box, Turkey	per ton	8	0	0	20	0	0
Cedar, Cuba	per ft. sup.	0	0	3	—	—	—
Do. Honduras ..	do.	0	0	3	—	—	—
Do. Tobasco ..	do.	0	0	5	—	—	—
Elm, Quebec	per load	4	10	0	8	0	0

Complete List of Contractions Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Aug. 25	Aberdare—Rebuilding the "Three Generals" .. ..	.. ..	T. Roderick, Architect, Clifton Street, Aberdare.
" 25	Aberdare—Making Good after Fire .. ..	.. ..	T. Roderick, Architect, Clifton Street, Aberdare.
" 25	Bridgwater—Bridge Works .. ..	.. ..	G. Lovibond, Clerk, Bridgwater.
" 25	Caerleon, Wales—Extension to School .. ..	.. ..	Landsdowne & Griggs, Metropolitan Bank Chmbrs., Newport, Mon.
" 25	Dundee—Walls .. ..	.. ..	J. Thompson, Harbour Engineer, Dundee.
" 25	Dundee—Re-erecting Sheds .. ..	.. ..	J. Thompson, Harbour Engineer, Dundee.
" 25	Rhymney, Wales—Committee Room .. ..	.. ..	G. Kenshole, Architect, Station Road Bargoed.
" 25	Rochdale—Convenience .. ..	.. ..	S. S. Platt, Borough Surveyor, Town Hall, Rochdale.
" 25	Swindon—Offices, &c. .. ..	.. ..	R. J. Beswick, to Victoria Road, Swindon.
" 26	Old Kilpatrick, Scotland—Additions to School ..	.. ..	Thomson, Turnbull & Peacock, 122 Wellington Street, Glasgow
" 27	Baltinglass, Ireland—Stove Dryroom .. ..	.. ..	J. Ralph Dagg, Clerk, Baltinglass, Ireland.
" 27	Garriffaith near Pontypool—School .. ..	.. ..	Guardians
" 27	Rugeley, Staffs.—Laboratory .. ..	.. ..	Trevelthick School Board
" 27	Distington, Cumberland—Alterations to School ..	.. ..	Rugeley Grammar School
" 29	Alverstoke—Work and Fittings at Workhouse ..	.. ..	Education Committee
" 29	Belfast—Two Villas .. ..	.. ..	Guardians
" 29	Halifax—Sludge Tanks, &c. .. ..	.. ..	Asylum Committee
" 29	Hull—Church, &c. .. ..	.. ..	Highways Committee
" 29	Pelaw—Club Premises .. ..	.. ..	.. ..
" 29	West Ham—Library .. ..	.. ..	Bill Quay Club Co., Ltd.
" 29	Ynshir, Wales—Hall, &c. .. ..	.. ..	Town Council
" 29	Wolverhampton—Chapel .. ..	.. ..	Standard Colliery Workmen's Committee.
" 29	Mawnan, near Falmouth—House, &c. .. ..	.. ..	.. ..
" 31	Carmarthen—Repairs to Schools .. ..	.. ..	H. Coode
" 31	Bristol—Church .. ..	.. ..	Education Committee
" 31	Wilwick—School .. ..	.. ..	.. ..
" 31	Sheffield—Workmen's Dwellings .. ..	.. ..	Education Committee
Sept. 1	London, N.—Additions to Workhouse .. ..	.. ..	Health Committee
" 1	Bristol—Foundations, &c. .. ..	.. ..	Guardians
" 1	Crookhaven, Co. Cork—Coastguard Station .. ..	.. ..	Electrical Committee
" 2	Lowestoft—Covered Markets, Pump House, &c. ..	.. ..	.. ..
" 2	Mansfield—Schools .. ..	.. ..	Great Eastern Railway Co.
" 3	Ticombe Fosbury, Wilts.—School .. ..	.. ..	Education Committee
" 5	Chelmsford—Foundations .. ..	.. ..	Education Committee
" 5	Ilkley—Library, &c. .. ..	.. ..	Town Council
" 5	London, S.E.—Alterations to Town Hall ..	.. ..	Urban District Council
" 6	Ponders End—Additions to School .. ..	.. ..	Bermundsey Borough Council ..
" 6	Ponders End—Block of Schools .. ..	.. ..	Enfield Education Committee ..
" 6	Richmond, Surrey—Enlargement of Post Office ..	.. ..	Enfield Education Committee ..
" 8	Ipswich—Wards .. ..	.. ..	Commissioners of H.M. Works and Public Buildings.
" 8	Penygraig, Wales—School .. ..	.. ..	Guardians
" 8	Barrow-in-Furness—Coastguard Buildings .. ..	.. ..	Rhondda U.D.C.
" 9	Hove—Coastguard Buildings .. ..	.. ..	Admiralty
" 9	Fifeness—Coastguard Buildings .. ..	.. ..	Admiralty
" 12	Cwmbran, Mon.—Chapel .. ..	.. ..	Admiralty
" 12	West Hanwell—Public Library .. ..	.. ..	Congregational Church
" 12	Liverpool—Post Office .. ..	.. ..	Urban District Council
" 13	Epping—Council Buildings .. ..	.. ..	Commissioners of H.M. Works ..
" 22	Bristol—Enlargement of School .. ..	.. ..	Urban District Council
ENGINEERING:			
Aug. 25	Ampleforth, Yorks—Waterworks .. ..	.. ..	Helmsley R.D.C.
" 29	Chipping Campden, Glos.—Waterworks .. ..	.. ..	Rural District Council
" 29	Fairfield, Derbyshire—Waterworks Extension ..	.. ..	Urban District Council
" 29	Ilford—Coal Bunkers, &c. .. ..	.. ..	Urban District Council
" 29	Wareham—Waterworks .. ..	.. ..	Urban District Council
" 30	Manchester—Wiring, &c. .. ..	.. ..	Corporation
" 30	Hove, Sussex—Mains .. ..	.. ..	Manchester Dock and Warehouse Extension Co.
" 30	Swinton, Yorks—Pumping Machinery .. ..	.. ..	Urban District Council
			E. J. Silcock, 10 Park Row, Leeds.
			Willcox & Raikes, 63 Temple Row, Birmingham.
			Swann & Brady, Town Hall, Chapel-en-le-Frith.
			A. Shaw, Electricity Works, Ilford.
			G. Chatterton, 6 The Sanctuary, Westminster.
			W. H. Hunter, Engineer, 41 Spring Gardens, Manchester.
			Handcock & Dykes, 1 Victoria Street, Westminster, S.W.
			R. Fowler, Engineer, Council Offices, Swinton, near Rotherham.

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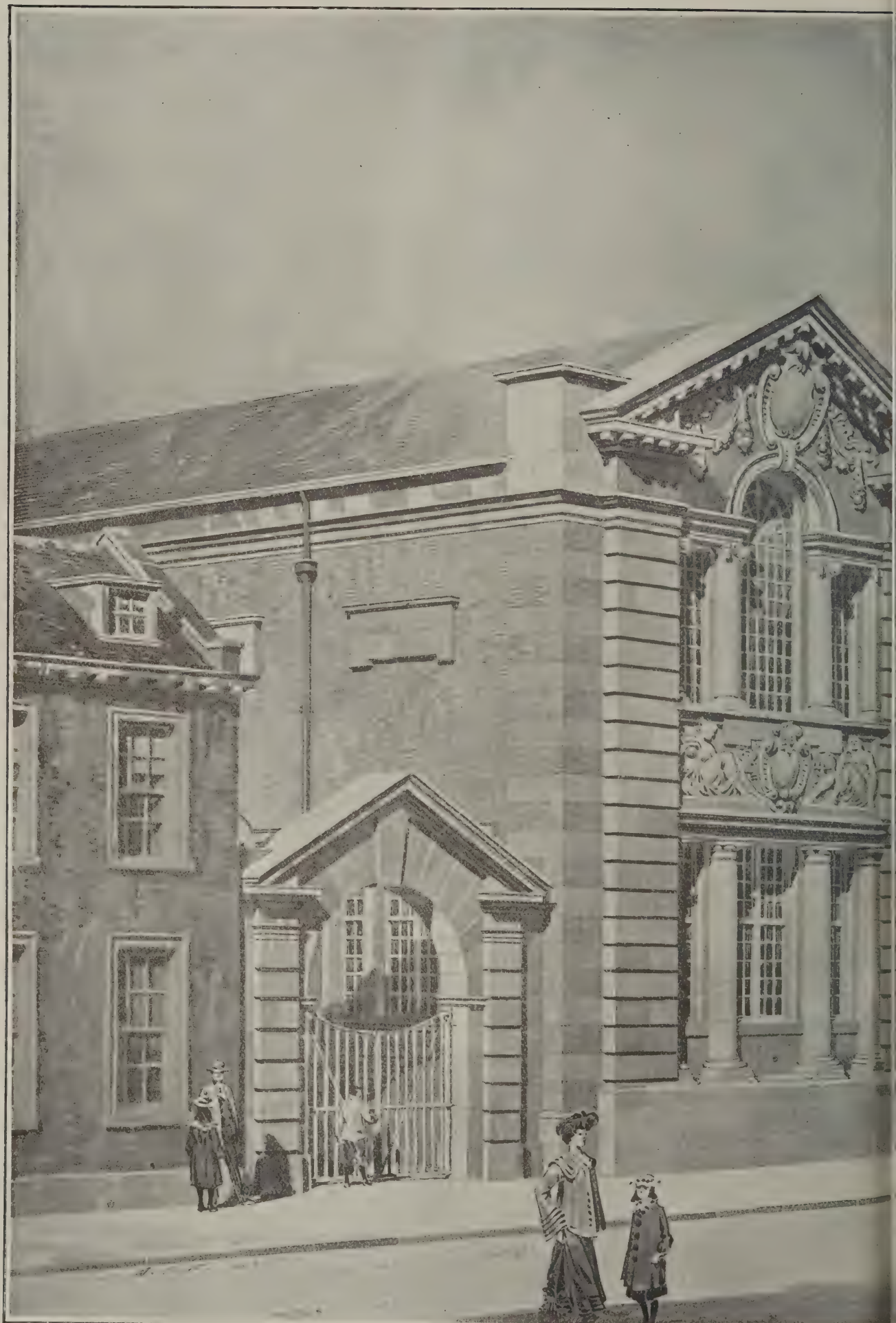
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

August 31, 1904. Vol. 20, No. 499.

6, Great New Street, Fetter Lane, E.C.

Summary.

At Croyland, a sleepy town in the Lincolnshire Fens, is the remains of an interesting Gothic abbey church and a curious triangular bridge dating from the end of the fourteenth century. (Page 108.)

Pierre Vignon was the architect of the Madeleine, which was designed as a temple on the Classical model in obedience to the command of Napoleon I., whose plagiarism from the Cæsars was so pronounced. (P. 109.)

There are three ordinary processes used for the photo-copying of drawings:—(1) the ferro-prussiate or "blue" process, giving white lines on a blue ground, and a modification called the "pellet" or "cyano," giving blue lines on a white ground; (2) the ferro-gallic process, giving dark violet lines on a white ground; and (3) the brown or sepia process, giving either white lines on a brown ground or brown lines on a white ground. There are also several permanent black line processes which are now being largely adopted for architectural work. (Page 112.)

The ruins of Tintern Abbey are undergoing necessary works of preservation; nothing in the way of restoration is being attempted, however, the new work not imitating the old so as to prevent any mistake being made as to what is original. (Page 114.)

The Simplon Tunnel is making good progress, and the workmen from the Swiss side are expected to shake hands with those from the Italian side in October. (Page 117.)

In Germany many ancient towns have the power to prevent vandalism or the erection of buildings in the streets inharmonious with the general character of the old buildings. (Page 117.)

A universal machine of 300 tons has been constructed for testing full-size structural members. It will admit a column or strut 88ft. long and 3ft. 3ins. square in cross-section, and it will admit a beam 3ft. 3ins. wide, 6ft. 6ins. deep, and 20ft. between supports. It will shear a bar of mild steel 8ins. by 2½ins. It will break a steel wire rope gins. in circumference. And it makes autographic stress-strain diagrams in all these tests. (Page 110.)

The suggested barrage across the Thames at Gravesend to Tilbury is proposed to be similar in construction to that across the Nile. Such a dam would make the present docks accessible at all hours of the day or night; the unsightly and foul-smelling mud-banks would no longer disfigure the river; a fresh-water lake forty miles long would be available for boating and pleasure traffic; and a supply of water would be provided for the new Water Board without going to Wales. (Page 117.)

The Volume Index to THE BUILDERS' JOURNAL is now issued separately, and not included in the copies of the weekly issue. It will be sent free by the Publisher on receipt of 1d. to defray postage.

Aphorism for the Week.

I should be glad to see you the instrument of introducing into our style that simplicity which is the best and truest ornament of most things in life, which the politer age always aimed at in their building and dress.—JONATHAN SWIFT.

Absurd By-laws Again.

MR. WILFRID SCAWEN BLUNT, lord of the manor of Worth, poet and philosopher, has been calling the attention of the public to our ridiculous local by-laws, which are largely responsible for the housing problem being one of such great moment. With the desire of providing cheap housing accommodation for agricultural labourers Mr. Blunt designed a bungalow of corrugated iron, lined with non-inflammable wood and felt, and furnished with a brick fireplace and chimney similar to one erected for his own use in the New Forest, the excellence of which all who have stayed there loudly praise, and this he had erected on his Sussex estate at Crabbet Park, Three Bridges. The bungalow, however, contravened the local by-laws, and the builder was first fined £5 and the East Grinstead Rural Council followed with a summons against Mr. Blunt and obtained from the magistrates a fine of 2s. for each day of the existence of the building from May 14th. A cramped four-roomed brick cottage costs about £200 to erect and yields a rent of 3s. 6d. a week, and, as Mr. Blunt has well said, "Charity apart, many landowners find no inducement to invest their money thus; and the poor freeholders, as their cottages crumble away are unable to replace them, and are therefore driven into the insanitary slums of towns." Seeking to find a remedy, Mr. Blunt finds a corrugated iron bungalow, which can be painted green so as to be unobtrusive in the landscape, gives the best results. "For one-storeyed buildings it is perfectly simple in plan; and any intelligent carpenter can put together the materials that are obtainable in the market. The mason's aid is confined to the low brick foundation and to the chimneys." Mr. Blunt adds a covered passage or verandah, which affords at a very small cost an additional space for use in fine weather and for protection in foul. Thus he finds himself able to build a cottage containing four living-rooms and a box-room covering an area of 750ft. and containing 8,000 cub. ft.; and also a verandah covering an area of 240ft., as well as an outbuilding for a washhouse and earth-closet, at a cost of not more than £130, all of which can be offered along with an acre of garden for half-a-crown a week. No objection was raised to the construction of the building provided it conformed to the measurements specified in the rural council's by-laws,

which have only recently been amended, namely, a superficial area of 400 sq. ft. and a capacity of 7,000 cub. ft. The cottage was built in a field by itself, quite away from any other cottage and separated by a wood a hundred yards wide from the nearest high road. The absurdity of these by-laws of the East Grinstead Council is apparent when we see that the building would have been allowed under the London Building Act clause which exempts buildings not exceeding 250,000 cub. ft. and distant 30ft. from the street and 60ft. from the nearest buildings and land of an adjoining owner. Some of the friends of the Council have endeavoured to make out that when amending its by-laws it tried to diminish their severity, but the Local Government Board would not give way. This absurd claim hardly needs disproof, and the by-laws are evidence of the incompetence of the Council and its advisers. In fact there seems no reason why the Council should have any by-laws at all, for a rural council—which that at East Grinstead is—need not adopt the Public Health Act of 1875 nor even Part III. of the Act of 1890, though the latter is advisable, for the Model By-laws suggested by the Local Government Board are quite unobjectionable. Formerly, under the Public Health Act the power to make by-laws was only conferred on urban district councils, and then the Model By-laws were stringent, though perhaps not unduly, as an urban district might be assumed to be closely populated and buildings close together. Therefore a local authority, feeling the need of some by-laws, had either to do without them or adopt them in all their stringency. Now, however, the Act of 1890 allows some slight control over sanitary housing without increasing cost unduly, or the Local Government Board will grant permission to adopt discriminatory by-laws in a district partly urban and partly rural, and this is what East Grinstead should have done. The urban by-laws generally throughout the country are, however, greatly in need of reform, and the new Model issued by the Board contains many unnecessary restrictions. To suggest that 400ft. super. is sufficient for a four-roomed cottage, and that Mr. Blunt should modify his building to conform to this, is illogical because a single-storey cottage of four rooms could only have rooms about 9ft. 7ins. by 9ft. 3ins. each, out of which would have to be taken the space for the fireplaces. Even half-timber is forbidden for cottages exceeding 400ft., nor would two storeys be allowed on any area. Mr. Blunt, recognizing the impossibility of giving adequate accommodation, has decided to demolish the cottage. This example has served a good purpose if it help towards reform.



CROYLAND ABBEY: SOUTH-WEST VIEW.

CROYLAND.

BY JOHN C. PAGET.

EAST ANGLIA is full of fine churches. They are large and planned perhaps for a bigger population than is now to be found in the little towns where many of them stand. Their characteristic feature is a combination of the earliest and latest forms of English church building, of the Norman round arch with the Perpendicular. Norman naves with massive piers are combined with Tudor windows and tracery, the latter sometimes not filling the window head but standing within and apart from it. Another characteristic arrangement is the building of a great west front in a different style to the body of the church, as at Peterborough and Ely, and virtually forming a Gothic portico or entrance to it. Many of these churches are found in remote and solitary places, and one of the most remarkable of them is that of Croyland (or Crowland). It stands just within Lincolnshire in the midst of the Fen which stretches far and wide about it; in the "Holland" division of the county whose scenery and watercourses recall its Dutch prototype and whose people are largely Flemish and Scandinavian in origin. The high west gable of the Abbey is seen for miles over the great flat pastures and seemingly interminable causeways which traverse them. In the little, quaint, sleepy town itself, at a point where three roads meet—for no water now flows under it—is the curious triangular bridge, a Gothic work of the late fourteenth century with six semi-arches forming three slightly re-entering angles when viewed from the street. The bridge is vaulted and approached by three rough flights of stone stairs meeting in a small space overhead; at the side of one is a mediæval figure, crowned and robed, seated and holding some stone object now worn completely out of shape; the features of the face are nearly obliterated; the figure was probably taken from the church, where it crowned the great gable.

Remains and fragments of the Abbey, once of vast extent, are found in many parts of

the town and neighbourhood, and not the least of its claims to attention is that the original "university settlement" at Cambridge was founded by a handful of monks from Croyland.

The earliest written record of the place is a charter of Ethelbald, king of Mercia, in A.D. 716, granting "the whole island of Croyland" to endow the abbey. This superseded the primitive structure, possibly of timber, which had been raised by Guthlac when he came to Croyland in "a boat" in the days of Conrad, king of Mercia. The nature of the ground necessitated the use of oak and ash piles for foundations. The abbey was burnt by the Danes in 870 and again in 1091 "by the carelessness of a plumber." In 1112 it was rebuilt once more. Then came the era of vaulted roofs and pointed arches, and in 1247 the church began to assume a Gothic form, to be again remodelled with Perpendicular detail under William of Croyland, "master of the works" between the years 1417 and 1427.

The great church consists at present of two fine aisles side by side; the south aisle was the Abbey church and is in ruins; the north aisle was always the parish church and is so still. Approaching from the west we see the church still in use and beside it a vast and empty Perpendicular arch through which glimpses are obtained of the old monastic ruins. The arcade dividing the aisles has been filled up. The west front is rich in figure sculpture, the figures, of which there are at least twenty, representing kings, queens, apostles, and abbots of Croyland, are under Early English traceried work, very shallow and scarcely amounting to tabernacles. Wandering round the building we see three great arches of the monastic nave supporting a huge fragment of wall; the piers deeply moulded and the first spring of the vaulting just visible overhead. Remains of Saxon carving are found here and there, telling of the older abbey burnt by the Danes, even the extreme loneliness of the site, originally chosen for its obscurity and consequent safety, being unable to protect it. The curious action which seems to raise the ground level in so many places has here been at work and the earth

has risen at least 5ft., concealing the bases of the piers, one of which has recently been cleared and brought to light. At the east end are the remains of a round arched tower, and one great arch stands boldly out with the teeth of its zig-zag mouldings sharply defined.

The great tower of the parish church is at the west end, a fifteenth-century work, supported by such mighty buttresses that its builders must have contemplated carrying it to a far greater height than it has actually reached; as it is, the summit is crowned by a wide but rather low stone steeple which contains the bells. Its lowest storey is practically an ante-chapel to the church; it contains a stone slab, formerly the covering of a coffin, on which is incised the figure of William of Wermington, the builder of the tower, holding a square in one hand and compasses in the other. The church, which is vaulted and of rather late Gothic, has been disfigured by wooden galleries and its floor greatly raised, the effect being perceptibly to stunt the interior; the rood screen of light wooden openwork remains and a Saxon font is sunk in one of the piers. There are few more curious buildings in England than this great church in the Fen.

Law Cases.

A Question of Trade Custom.—A somewhat curious case was recently heard at the Sheffield County Court. Messrs. Woollen & Co., sign writers, sued the Flintine Dental Co. for 15s. 6d. for lettering and gilding a glass globe which was brought to them by the defendants. The glass had to be sand-blasted, and as this was a somewhat risky process Messrs. Woollen distinctly stated that the work must be done at the defendants' risk. The globe broke and the defendants then sent another globe, which was safely and properly completed, but they refused to pay for the work and counter-claimed 17s. 6d. for the first globe. Messrs. Woollen called evidence to show that "owner's risk" was the custom of the trade. The judge said it was quite clear the defendants must pay the 15s. 6d., and he could not allow the counter-claim. Judgment accordingly.

THE LETTER-WRITER.

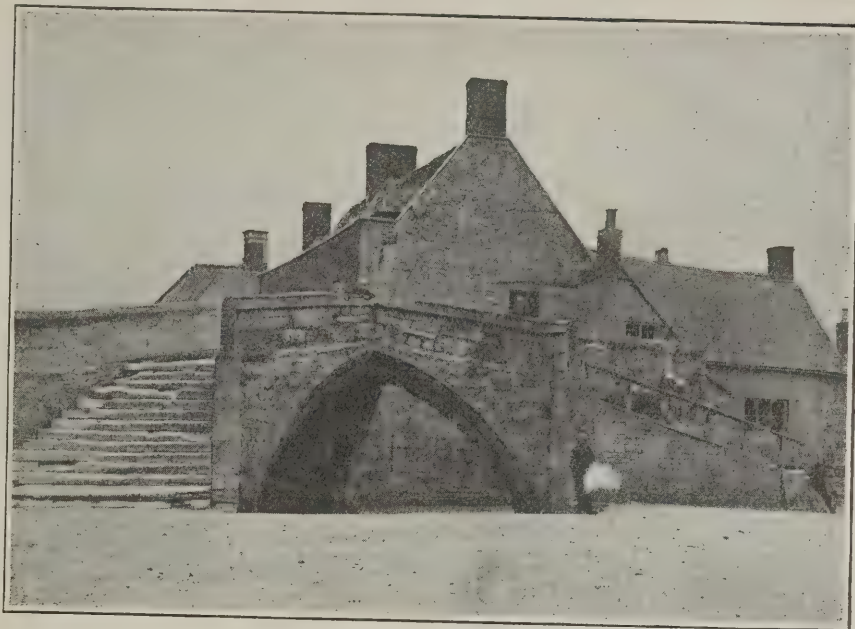
NOW is the time for the newspaper letter-writer. We notice especially two of his effusions. One gentleman has busied himself with the dangers of the pavement; he has counted 300 manhole covers, coal-plates, lamp posts and other metal obstructions between the middle of the Strand and Ludgate Circus; and these prompt him to enquire in the "Times" "whether even our pavements are safe for pedestrians"; he gravely points out the danger of such iron things, by reason of their uneven wearing compared with the surrounding pavement, "even when not charged with electricity." Another gentleman writes to the "Morning Post" about the smoke nuisance, from which it appears that he has been making investigations on the roofs around Eaton Square, counting the chimneys that are below the second-floor bedroom windows. No one, he says, would choose to sleep with his head in a chimney pot, and to sleep just above one is scarcely desirable. "In fact, the loss of health and of temper and the destruction of paint and furniture arising from such imbecile architecture are obvious. . . . All these low-placed chimney stacks should be swept away and all the chimneys be connected singly or in groups with metal pipes or flues taken at a suitable angle and run into the nearest tall kitchen chimney. By this simple means (!) the combustion in the fireplaces below would be vastly improved, what little smoke they caused would be discharged into the air above all sleeping rooms, and we should be freed from the hideous spectacle of thousands of crooked, clumsy, distorted chimney-pots befouling the air in the confined spaces at the backs of tall houses and choking the occupants of the bedrooms there."

Obituary.

Mr. William Hudson, a retired builder, of Harrogate, aged 62 years, died last week.

Colonel Christopher Elison, V.D., J.P., the head of the well-known Liverpool firm of architects and surveyors, died last week in his seventy-second year. Colonel Elison was the first president of the Society of Architects and had an extensive practice, largely in business premises and banks.

Mr. Alexander M. Thomson, of Montrose, died recently after an operation. He was only thirty years of age. In 1898 he moved to Keith, and became associated in business with his father, who is architect to the Duke



THE TRIANGULAR BRIDGE, CROYLAND.

of Richmond and Gordon, the connection continuing until the younger Mr. Thomson's death.

THE ARCHITECT OF THE MADELEINE.

THE discovery of the tomb of Pierre Vignon, the principal architect of the Church of the Madeleine, at Paris, hidden under a pile of stones in the crypt of that building, is a curious instance of the transitory nature of some reputations. When, less than a hundred years ago, Napoleon commissioned him to build a "Temple of Glory" on perhaps the most conspicuous site in the French capital, his name must have been in every man's mouth. But he died, leaving his work incomplete; tastes changed and Vignon was forgotten. Besides, the Madeleine took so long to finish that the Parisians might well be excused if they ceased to connect any particular person with an edifice which several generations had seen surrounded by scaffolding.

The church was originally designed in 1764 for Louis XV. by Constant d'Ivry. His plans were freely altered by Couture, and

the whole undertaking was suspended by the Revolution. It was in 1806 that Napoleon ordered Vignon to convert it into a temple, on the Classical model, to celebrate the prowess of the Grand Army, adding, with characteristic frugality, that he was to make as much use as might be of the materials of Constant d'Ivry. The architects of those days had to contend with abrupt mutations of idea as one form of government succeeded another.

When the Restoration placed Louis XVIII. on the Throne of France he wished the Madeleine to be transformed into an expiatory chapel, with monuments to Louis XVI. and Marie Antoinette. Vignon, however, succeeded in preventing a modification of his designs, and on his death in 1828 his pupil and successor, J. J. Huvé, felt bound to follow them, though against his own judgment. The Madeleine, under the direction of its fourth and last architect, did not receive its final touches until the reign of Louis Philippe was nearing its close. Huvé's heart, as we may conjecture, was not thoroughly in the work of Græco-Roman compilation. He was destined to carry on the frigid Classical style when the Romantic movement was at high tide and had carried painters, poets and architects off their feet. Yet the building has never lacked admirers, and its praises have been sounded in unlikely quarters. Thus Hawthorne, despite his New England upbringing, did not hesitate to call it "glorious and gorgeous," to extol the stateliness of the entrance to the nave, and the gilding, "lavished like sunshine," in the interior. To Balzac the Madeleine was "a great and beautiful thing," though he denounced the *infames sculptures de café* of the side friezes.

Fine though it appears, in its way, particularly when the eye dwells upon its Corinthian colonnade, the Madeleine unquestionably "dates." Its source of inspiration is not pure Greek, but Roman adaptations of Hellenic conceptions. It is therefore a thoroughly typical example of that plagiarism from the Cæsars which Napoleon elevated into a principle of statecraft. The triumphal arch of the Caroussel was imitated from that of Septimus Severus at Rome. The column of the Place Vendôme was reared on the model of Trajan's; and to the Romans, too, he went for the Arc de l'Etoile. His profound knowledge of the French nation was in no case more markedly displayed than in the direction he gave to their zeal for antiquity.



THE BRIDGE, CROYLAND: THE SEATED FIGURE.

Construction Notes.

The Effects of Lightning.

BEFORE the British Association last week a paper on "The Effects of Lightning" was contributed by Mr. Killingworth Hedges, C.E., hon. secretary of the Lightning Research Committee, which is now concluding its investigations of the last three years and will shortly issue its report. Mr. Hedges described the results and vagaries of lightning stroke, quoting examples taken from forty buildings which were fitted with so-called "lightning conductors," noting that considerable damage occurred in each case, and that, therefore, the present system of protection is wanting, and that there is room for improvement. He contrasted the arrangements on our public buildings here with the more complete methods adopted abroad, especially in Germany, where the authorities insist on scientific methods; he also showed that the idea of any building being safeguarded by a few rods on the highest points is a complete fallacy—in fact, there is danger, in that some of the flash may leave the conductor and jump to some part of the roof, and, without there is a recognized path for it to travel to earth, a fire may ensue. In one case quoted, a column of smoke issuing from the side of a high chimney was selected by the lightning, instead of striking the conductor which had been duly provided.

A Testing Machine for Full-sized Members.

ANOTHER interesting paper read before the British Association last week was that by Mr. J. H. Wicksteed on a universal testing machine of 300 tons for full-sized structural members. He said the machine would admit a column or strut 88ft. long and 3ft. 3ins. square in cross-section, and it would admit a beam 3ft. 3ins. wide, 6ft 6ins. deep, and 20ft. between supports. It would shear a bar of mild steel 8ins. by 2½ins. It would break a steel wire rope 9ins. in circumference. And it made autographic stress-strain diagrams in all these tests. The sensibility of the machine with a pull of 100 tons was 1 in 10,000. The purpose of the machine was not simply that of testing the strength of material itself, but for testing the strength of a full-sized member of any structure. The reason for employing a machine for the purpose of making tests instead of putting full loads directly upon the specimen was that for no reasonable cost could experiments be made with heavy loads applied in bulk. Three hundred tons of accurate deadweights would themselves cost about £2,400, and their application to the specimen would be so tedious that each experiment would cost as much in time and in labour as 100 experiments conducted in the machine described, where the full load was applied through hydraulic pressure and balanced by small accurate weights acting through levers and knife-edges.—In the discussion that followed the reading of the paper it was generally agreed that the advantages of testing full-sized members were very great, but it was also pointed out that for ordinary engineering purposes extreme accuracy was not absolutely needed—a view, however, with which Mr. Wicksteed did not agree. The well-known fact that the position from which a test piece was taken largely affected the results was dwelt upon by some speakers; in a case of one bronze it was said the variation was 30 per cent.

Brittleness of Structural Steel.

AN important paper on the fracture of structural steel under alternating stresses was read by Professor J. O. Arnold. In order to elucidate some obscure causes of unexpected brittleness in steel he said he had

devised a machine the object of which was to apply to a test piece seven alternating stresses slightly beyond the elastic limit. By means of this instrument the remarkable fact was noted that "in all probability the resistance of structural steel to rupture under rapidly alternating stresses was inversely proportional to the rate of alteration." An important practical result of the tests was that one side of a plate was brittle and the other tough under alternating stresses. It was also assumed that once a steel had assumed decisive brittleness it could not be restored by heat treatment short of remelting.

Finland Asbestos.

A NEW kind of asbestos is now coming from Finland. It consists of a specifically very light, voluminous, flaky and tender fibre, almost as white as snow, the longer parts of which can be spun alone or together with other qualities of asbestos, while the short parcels will do most excellent service as insulating material, filtering, pasteboard and for other purposes. Finland is very rich in silicious deposits, which are met with in the shape of talc, asbestine and asbestos, as is well known. Purity and whiteness in the first place, copiousness of fibre in the second, determine the value of the merchandise. All of the three species are to be found in Finland, but it is still a question whether the former two of them, on account of their colour, will soon obtain any practical importance, while the usefulness of the asbestos cannot fail to be recognized at the first look. The existence of asbestos in Finland has been known for several years past, but much time has been required and many difficulties had to be overcome to recognise and determine the zone containing the asbestos. This work has been carried through by the Finska Asbestos Company, which has secured the right of working the spots for a period of fifty years by means of purchasing property or concluding contracts of lease for the ground with the owners. The Company have made an agreement with Herr Rud. Kroseberg, of Joachimsthalerstrasse 24, Berlin W. 15, who is exploiting the mines. He has uncovered the mines, and last year carried out extensive boring and blasting operations. Herr Kroseberg has visited and examined a large number of asbestos deposits in Finland, and his opinion is that among the enormous layers of silicious magnesia in Finland but a small number of deposits can be taken into consideration for the extraction of asbestos. So, among the fifteen spots under the control of the Finska Asbestos Company, only three or four deposits have proved really valuable on close examination. But the abundance of asbestos found on those spots far exceeds all expectations, and may be figured at hundred thousands if not millions of tons, for the asbestos mineral is not found in veins and lodes of a few inches in width, but in quantities represented by whole rocks and mountains. As regards the geographical position, the zone containing the asbestos is situated exclusively in the centre of Finland, about midway between the railway terminal stations of Kuopio and Joensuu. Some of the deposits are lying direct on navigable water, but the main portion of them is to be found at a distance of twenty to twenty-four miles from the lake district connected via Wiborg with the sea, and at twice that distance from the two railway stations mentioned. Transport is therefore easy. The mining is open work.

Fire-resisting Wood.

SOME valuable recipes for the rendering of wood fire-resistant are given in the "Technologie sanitaire." During the course of his interesting study on the incombustibility of woods, M. Ch. Girard gives a number of formulæ for solutions and coatings. The one he most highly recommends con-

sists in the immersion of the wood in a saline solution composed as follows:—

Phosphate of ammonia	-	100 kilos.
Boric acid	-	10 "
Water	-	1,000 litres.

The following may also be given, though the results obtained are not so good:—

Sulphate of ammonia	-	135 kilos.
Boric acid	-	5 "
Borate of soda	-	15 "
Water	-	1,000 litres.

To create greater effect, a number of successive coatings may be applied.

FIRST FORMULA.

Liquid silicate of soda	-	1,000 grammes.
Carbonate of lime	-	500 "
Glue size	-	1,000 "

SECOND FORMULA.

This is applied in two distinct coats, and by virtue of its composition, would appear to be superior to the foregoing:—

First application—

Sulphate of alumina	-	20 grammes.
Water	-	1 litre.

Second application—

Liquid silicate of soda	-	20 grammes.
Water	-	1 litre.

THIRD FORMULA.

Solid silicate of soda	-	350 grammes.
Amianthus powder	-	350 "
Water	-	1 litre.

FOURTH FORMULA.

Amianthus powder	-	35 grammes.
Borate of soda	-	20 "
Water	-	100 cub. centim.
Gum lac	-	10 to 15 grs.

Dissolve the borax in warm water, and add the gum lac in small portions until complete solution, and then incorporate the amianthus. These two last formulæ give a superficial protection which lasts as long as the coating remains in a good condition.

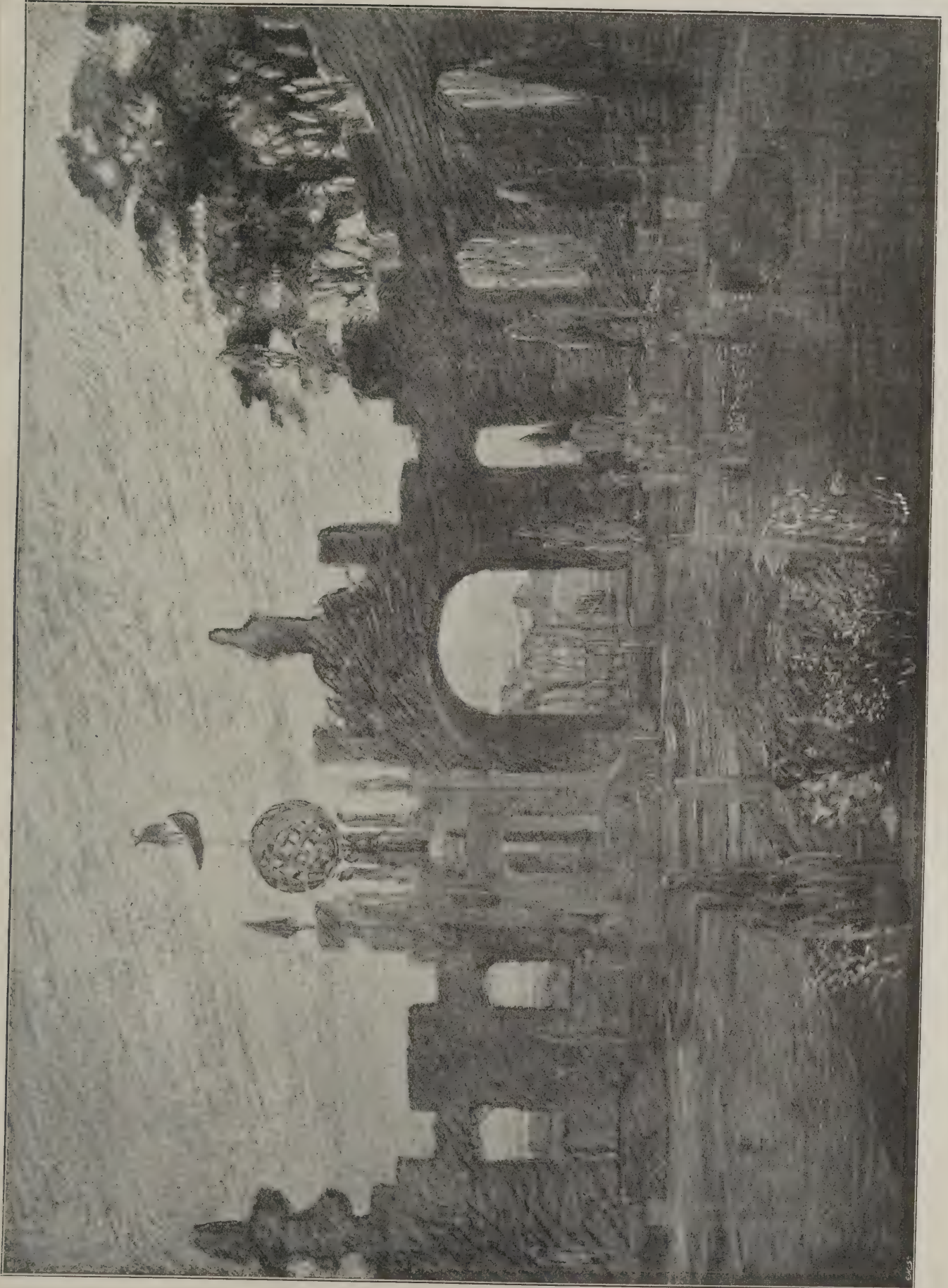
Views and Reviews.

An Engineering Correspondence Course.

We have been favoured with copies of the "Alpha" and "Beta" courses of correspondence lectures of the Midland Engineering Bureau, of the Strand Chambers, Derby. These we may say briefly are very clearly written and admirably practical, and anyone taking these courses cannot fail to receive very great benefit and be able to competently design simple structural ironwork. The "Beta" course has been specially drafted for those approaching the subject for the first time, and it includes nothing that does not have a direct bearing upon the design of members. Only simple arithmetic is used, there being none of the mathematical gymnastics or purely theoretical examples which are generally found in text-books. The explanations are terse, and many of the difficult points that arise in actual practice and are not to be found in books are here dealt with. The "Beta" course of twelve lectures deals with the design of plate girders, stanchions, struts, and generally all that is necessary to know for designing architectural steelwork. The "Alpha" course consists of ten lectures and deals with analytical and graphical determination of stresses in framed structures, also without requiring much mathematics, and generally goes more deeply into the subject than the "Beta" course.

Change of Address.—Mr. W. Lumsden, Admiralty Inspector of Works, has removed from 14, Bridge Street, Montrose, to Crail, Fife, N.B.

The Simplex Steel Conduit Co., Ltd., of Westinghouse Building, Norfolk Street, Strand, W.C., have just issued a new show-card. This is a linen sheet showing illustrations of most of the firm's well-known fittings, with a length of their tubing top and bottom.



STUDY FOR A FORMAL GARDEN. H. WILSON, ARCHITECT.

PHOTO-COPIES OF DRAWINGS.

HAVING received many enquiries at one time and another as to the making of sun-prints or photo-copies of drawings, we have set down the following particulars, which we think will be of real use to numerous readers.

In commercial practice there may be said to be three ordinary methods of photo-printing, namely:—

(1) The ferro-prussiate or "blue" process, giving white lines on a blue ground; and a modification of it called "Pellet" or "cyano" which gives blue lines on a white ground.

(2) The ferro-gallic process, giving dark violet lines on a white ground.

(3) The brown or sepia process, giving either white lines on a brown ground or brown lines on a white ground.

Besides which there are several special processes.

The ferro-prussiate or "blue" process is the oldest, simplest and cheapest. It seems first to have been used by Herschel in 1840. In order to give the uninitiated a thoroughly intelligent account of the working of this and other papers, we shall be obliged to dip into a little elementary photography, for which we must beg the indulgence of those readers who are familiar with the subject.

Let it be first stated then that if something opaque is placed upon a piece of sensitized paper and the latter exposed to light, a chemical change will take place in the exposed portions. With some kinds of papers this change is shown at once by an alteration in the tone of the exposed parts, whereas in others no change is observable until the paper is "developed"; thus, if a fern leaf is put on a piece of paper sensitized with chloride of silver and then exposed to sunlight, the parts covered by the leaf will remain unaffected, while the rest of the paper will turn dark brown or black (according to the length of time it is exposed); and thus in the end we shall have a white impression on a dark ground. On the other hand, if the leaf is put on a piece of "bromide" paper, that is, paper sensitized with bromide of silver, and then exposed to gaslight for a few seconds, no change in the appearance of the paper will be apparent, though a chemical change has taken place during exposure, and the image of the leaf will only become visible when a developing solution is poured over the paper—the whole operation in this case being conducted in an orange or red light, which is non-actinic.

Having thus made clear what photo-printing is, we may turn to the several processes enumerated at the commencement of this article. The paper used for the

Ferro-prussiate or "Blue" Process

is sensitized with a solution of ferric salt and potassium ferricyanide. The paper must be fairly fresh in order to obtain good results. In towns and cities where new supplies can be obtained easily, it is more convenient to buy the paper ready-made than to coat it oneself. It is not costly and can be purchased at any photographic dealer's. But as it needs to be used fresh one had better avoid the dealer who has little demand for it and go instead to a firm which always keeps new stock. The following are some prices:—

Ferro-prussiate Papers.
In Rolls 32ft. long.

Quality.	Thickness.	Per Roll, 30in. wide.	Per Roll, 40in. wide.
Ordinary	Medium	s. d. 2 6	s. d. 3 6
Best	Thin or Medium.	3 6	5 0
"	Stout	4 0	5 6
<i>Rapid Printing Papers.</i>			
Ordinary	Medium	3 0	4 6
Best	"	4 0	5 6

Ferro-Linen.

Ordinary Limp - - 30in. wide, 9s.; 40in. wide, 13s.

Ferro-prussiate Paper Mounted on Linen.

Best - - - 30in. wide, 9s.; 40in. wide, 12s. 6d.

Taking an ordinary quality of medium ferro-prussiate paper at 2s. 6d. per roll, and calculating that one can get sixteen sheets Imperial size (30in. by 22in.) out of a length of 32ft.—allowing for cutting and waste—it will be seen that the cost is not quite 2d. per sheet, so that, even though it is somewhat cheaper to coat the paper oneself, the saving is hardly worth the trouble incurred. However, there are occasions and places when the paper cannot be bought for love or money, and it is useful then to know how to prepare it. Two solutions are needed. Dissolve 800 grains of ferric am. citrate—nearly $1\frac{1}{2}$ ozs. (apothecaries' weight)*—in 10 ozs. of water. Dissolve 600 grains of potassium ferricyanide— $1\frac{1}{2}$ ozs.—in another 10 ozs. of water. Mix these two solutions together and pour into a stone jar or bottle. Do not use an ordinary white or blue glass bottle, unless wrapped around with brown paper or kept in a dark place, as the solution is sensitive to white light. The paper to be coated should be pinned down on a board and the solution should be applied with a sponge, the operation of course being conducted in a subdued light or by gaslight. The sponge should not be overcharged with liquid, and it needs to be used swiftly, boldly and evenly all over the paper. When coated set the sheet to dry in the dark—a cupboard will serve.

We can now proceed with the process of printing.

The tracing to be used should be in clean, solid black lines. Broken or weak lines will be correspondingly defective on the print. A good way to test the lines is to hold the tracing up to the light; bad lines can then be seen at once.

The printing frame is simply a wooden frame fitted with a plate of glass and a removable hinged back pressed in place by spring bars. Put the tracing with the drawn-up side next the glass and the ferro-prussiate paper on top of it, the sensitized side being of course in contact with the back of the tracing; shut up the frame; then put out to print. As to how long this will take depends entirely on the light. The colour of the paper will change gradually, becoming yellowish-green, bluish-green, bluish-grey and finally olive-green. On a bright summer day, with the frame in the sun, the print will be done in about ten minutes. On dull days, however, it will be a very different matter, and the advantage of the rapid printing papers included in the foregoing table will then be appreciated.

After printing take the paper out of the frame and wash it for fifteen minutes in cold water. The ground will then turn blue and the lines white. If the print has been over-exposed the lines will be more or less bluish; if under-exposed they will be faint and the ground a weak colour. Not very much can be done to improve the print if it has been wrongly exposed, though over-exposure can be corrected to some extent by the use of a chrome salt solution and under-exposure by intensifying with a weak solution of sulphuric acid: after either of which the print must be thoroughly washed. Hang up to dry, using clips or pins.

The modification of the ferro-prussiate process called the Pellet or cyano is more expensive and more difficult to work, consequently it is not used to anything like the same extent as the other. But the paper has the advantage of being much more rapid, an

exposure of a little over a minute in summer sunlight being sufficient. When exposing this paper by daylight, however, it is absolutely essential to use test strips, as the exposure can never be accurately gauged without doing so.

After exposure lay the paper face downwards on a board and turn back the edges for about $\frac{3}{4}$ in. all round in the form of a tray. Then float it face downwards on a bath of yellow prussiate of potash, 1 oz. in 10 ozs. of water. Run the fingers all over the back so as to bring every part of the paper in contact with the solution and drive out air-bubbles. The turned-up edges will prevent the solution getting on to the back of the paper, which it would stain. If properly exposed the lines will develop to a vigorous blue and the ground be clear yellow. Over-exposure makes the ground bluish; under-exposure produces feeble and broken lines. Development in the potash bath will be finished in about half a minute; it can be watched by taking out the print now and again.

After development wash the print in cold water. This will remove most of the potash. The yellow colour of the ground has now to be made white—that is to say, the gum has to be dissolved out. For this a weak solution of sulphuric acid ($1\frac{1}{2}$ ozs. to 20 ozs.) is needed. Leave the print to bleach in it for 10 minutes. Then wash thoroughly in water for a quarter of an hour, using a soft wide brush to clean the ground if necessary.

The defects due to wrong exposure of this paper have already been mentioned. Other defects are:—(1) Blue stains in patches—caused by air-bubbles, or the print not being uniformly in contact with the developer, or by the developer getting on the back of the print, or by stained fingers during washing; (2) a spotted ground—caused by the print being allowed to remain too long in the potash solution; (3) a yellow ground—insufficient bleaching in the acid. Blue stains can be removed with an oxalate of potash solution (75 grains to 1 oz.).

The cost of this process can be calculated from the following:—

Best Quality Pellet or Cyano Papers.

In Rolls 64ft. long.

Stout, 30in. wide, 14s.; 40in. wide, 23s.

Yellow prussiate of potash 1s. 6d. per lb. Sulphuric acid 1d. per oz.

Taking an ordinary roll 30in. wide at 14s., and calculating on getting thirty-two Imperial sheets from it—and allowing, say, 1s. for chemicals used—the cost per finished print would be $5\frac{1}{4}$ d., nearly three times that of "blue" prints. While making this comparison we may add that, supposing a negative of the tracing were made on thin sepia paper at 5s. 6d. per roll, and a "blue" print taken from that on "slow" paper, the cost per print would be 6d.—this assuming a separate negative to be taken for each of the sixteen sheets, whereas it is probable several copies of one tracing would be needed, in which case the one negative would serve for all and the cost would be proportionately less. But the blue line obtained in this way is by no means strong, and as an additional set-off against it, the cyano has the advantage of saving time in printing.

We may now turn to the

Ferro-gallic Process.

which gives a dark violet line on a white ground. This is a very popular process. It is cheaper than the cyano and far simpler to work, though the paper takes much longer to print and the ground is almost always tinged with violet.

Ferro-gallic papers can be worked with a water-bath or an acid bath. Their cost is given on the next page.

Taking the same basis for calculation as before—sixteen Imperial sheets to the roll—the cost per finished print will be about $4\frac{1}{2}$ d., as against 2d. for ordinary "blue"

Fluid Measure.

*20 grains	- 1 scruple.	63 minims	- 1 dram.
3 scruples	- 1 dram.	8 drams	- 1 oz.
8 drams	- 1 oz.	20 ozs.	- 1 pint.
12 ozs.	- 1 lb.	8 pints	- 1 gallon.

prints, 6d. for prints on ferro-prussiate paper with the use of a sepia paper negative, and 5 $\frac{1}{4}$ d. for cyano prints.

Ferro-gallic Papers.
In Rolls 32ft. long.

Best Quality.	Thickness.	Per Roll.	
		30in. wide.	40in. wide.
Acid Bath	Medium	s. d. 6 0	s. d. 8 0
	Stout	7 0	9 0
	Extra Stout	8 0	10 0
	Medium	6 0	8 0
Water Bath	Stout	7 0	9 0
	Extra Stout	9 0	12 0
<i>Mounted on Linen.</i>			
Water Bath	—	15 0	21 0

The method of working ferro-gallic papers is as follows:—Taking the acid bath process first. Print till the lines are clearly visible; they should be strong yellow ones. Put the paper in a developing dish and pour over it a solution of gallic acid ($\frac{1}{2}$ oz. in 50 ozs.—the acid being first dissolved in boiling water and hot water afterwards added to make up the quantity). Keep the paper evenly covered by the developer, using a soft brush to distribute the latter, until the yellow lines become black. Then wash thoroughly and hang up to dry. Use fresh developer for each print, and use it hot; and put sufficient in a cup or glass to flush the print in the dish.

By the water-bath process the print is simply washed for a minute or two, like a "blue" print, the necessary acid having been rubbed into the paper at the time of coating; the lines will turn black and the ground white. If the print has a mauve ground, under-exposure is the cause; if a very white ground with weak lines, over-exposure. An exposure of about twenty-five minutes in the sun will be found about correct. In handling the paper before printing care must be taken not to soil it with the fingers.

The Brown or Sepia Process

now remains to be dealt with.

The cost of the paper is as follows:—

Best quality in Rolls 32ft. long.			
Thickness.		Per Roll.	
		30in. wide.	40in. wide.
Thin	- - - -	s. d. 5 6	s. d. 7 0
Medium	- - - -	7 0	9 0
Stout	- - - -	7 9	10 0
<i>Sepia Linen.</i>			
—	—	10 6	15 0

The paper gives white lines on a brown ground; if the reverse is desired, a negative made on the thin quality paper must be used. (It will be understood that thin quality "blue" paper, though so much cheaper, could not be used for making negatives, owing to its colour—blue being strongly actinic.) Taking the medium quality of brown paper, at 7s. a roll, and calculating as before, the cost per Imperial sheet would be about 5 $\frac{1}{4}$ d. Considering that it is just as unsuitable for colouring as the "blue" the difference in cost of one and the other (5 $\frac{1}{4}$ d. as against 2d.) rules this brown paper out of court in ordinary practice, though we should add that it can be printed more rapidly than the blue, and will keep fresh for a long time—a year. A combination of brown papers is what is chiefly used—that is to say, a negative is made on the thin quality and prints taken from that, giving dark brown lines on a white ground. The working of the paper is quite simple. Print till the lines show up light yellow (this will be in about three minutes in the sun), then wash for a few minutes in running water. With the ferro-prussiate and ferro-gallic (water-bath) papers nothing more than this needs to be done, but brown prints have to be "fixed"

afterwards by placing them for a minute or so in a solution of hypo-soda $\frac{1}{4}$ oz., water 20 ozs. Finally wash for a quarter of an hour and hang up to dry.

We have now dealt with the three processes of photo-printing in general use. Each has its advantages and disadvantages. The "blue" is the cheapest and is quite permanent, but it is useless for colouring; the ferro-gallic fades and discolours after a year or two, it very rarely gives a perfectly white ground, and it is very slow in printing; the cyano prints rapidly, but is more expensive, requires strong chemicals to develop it, and is very liable to rot; the brown is not permanent and in order to get dark lines on a white ground it is necessary to use a negative, though the paper prints quicker than the ferro-gallic and is easy to work. To get over these defects, special "permanent black line" processes have been introduced by several firms, each of which again has its merits and demerits, either in regard to the finished result or the cost of it; so that the reader must find out for himself which suits his own particular needs best. The original process was discovered by Poitevin about fifty years ago, and Messrs. Norton & Gregory, of Westminster Palace Gardens, S.W., were the first to introduce a successful modification of it in combination with a sepia negative. Their process is a secret, but may be said to be one in which a bichromate sensitizing solution is used, either on linen or paper, the result being a solid clean black line on a white ground.

Another process is worked by Messrs. B. J. Hall & Co., of 39, Victoria Street, S.W., who supply prepared paper as follows:—

In Rolls 32ft. long.

	Per Roll.	
	30in. wide.	40in. wide.
Thin	s. d. 6 0	s. d. 9 0
Stout	7 6	10 0

The process of working this paper is as follows:—Make a negative from the tracing and print from it on to the "black line" paper till the lines show dark brown on a pale yellow ground. Take the print out of the frame and pin it on a board. Mix some lampblack and methylated spirit in a saucer and apply this with a sponge, rubbing it all over the print. At this stage the process looks very unpromising. But on removing the print to a bath and pouring water at a temperature of 110 degs. Fahr. over it, the sensitized coating or ground will dissolve and the pigment with it, leaving the lines in clear black. (The sensitizer evidently contains bichromate of potash. This has the property of rendering gelatine insoluble after exposure to light. Hence the lines remain and the ground vanishes.) Clear the paper with a sponge, then wash well in cold water and hang up to dry. Broken lines indicate under-exposure; a dirty ground over-exposure. The feature of this process is that no acid is used for bleaching the ground and consequently the prints will not fade or rot. They are eminently suitable for colouring and additional lines can be ruled in so as to be indistinguishable from the rest.

Still another process is worked by Mr. John B. Thorp, of the London Drawing and Tracing Office, 98, Gray's Inn Road, W.C. This is called "Lithotype." In reality it consists in making a sepia paper negative of the original and with that obtaining a print on lithographic transfer paper, the process afterwards being ordinary lithography. The result is very good, and as the paper is printed from stone in the usual way its surface is not changed in the least by any immersion in water or chemicals; this applies especially to prints on transparent tracing cloth, which look like originals.

The reader will have to settle for himself

which of the several processes to adopt. Many considerations have to be taken into account—cost, colouring, permanence, facilities for working, &c. We may, however, summarize the cost as follows:—

Cost per finished Print (Imperial Size—30in. by 22in.).

Ferro-prussiate (white lines on blue)	-	d. 2
Ferro-gallic (dark lines on white)	-	4 $\frac{1}{2}$
Brown (white lines on brown)	-	5 $\frac{1}{2}$
Pellet or cyano (blue lines on white—direct, without negative)	-	5 $\frac{1}{2}$
Ferro-prussiate, using paper negative (giving blue lines on white)	-	6
"Permanent black line"	-	8
Brown, using paper negative (giving brown lines on white)	-	9

On comparing these prices with those charged by business firms it would seem that one should certainly make the prints oneself and so effect a large saving. The fact should not be forgotten, however, that the ordinary man does not get all good prints; he spoils many unless regularly making them, especially if he is working by daylight instead of the uniform artificial light which trade firms employ. Moreover, there is the value of the time occupied to be taken into account, the proportion of rent and establishment charges, and the cost of apparatus, &c., all of which, when added together, reduce the apparent saving considerably.

Apparatus.

There is very little apparatus needed, but we may add a few remarks about frames and dishes. The amateur photographer with his quarter or half-plate, even his whole-plate camera, does not find printing frames and dishes a very expensive item, but things are different when we are dealing with sheets 22in. by 30in. and larger. An Imperial-size printing frame will cost about £2 10s. ready-made, though something a good deal cheaper—and serviceable enough for ordinary casual use—could be had by getting a picture-framer to make a strong frame fitted with a stout wooden back covered with felt inside, hinged in three parts and held in place by four flat bars having springs underneath.

In cases where "blue" or other simple prints are wanted now and then, a board covered with felt and a sheet of plate glass will serve as an excellent makeshift. The "blue" paper should be cut a little larger than the tracing so as to leave a margin by the changing colour of which exposure may be gauged. The paper would of course be laid face upwards on the board, then the tracing put over it, and the two held together by the glass on top of them.

As to dishes, one having a glass or slate bottom with wood sides, fitted with plug, outlet and legs, will cost about £1 8s. Imperial size, or £2 for Double Elephant. It is most important to use clean dishes, otherwise prints will get spotted and patchy. Zinc dishes cost about 12s. Imperial size and 16s. for Double Elephant; wood dishes lined with lead £1 5s. and £1 15s. respectively.

In washing or developing, if the dish is flushed with water and then emptied the paper can be made to stick to the bottom and the water or developer then poured evenly over it. This will need to be done rapidly and neatly.

Water-supply is a matter for consideration. Prints can be done with a dish and a couple of buckets, but it is very much better to have a proper tap supply and a sink. Blue prints, ferro-gallic (water-bath) prints and "permanent black line" prints can be produced without using a dish, by simply pinning them down on a board and washing them under the tap. For cyano and brown prints, however, dishes are a necessity.

Now, in conclusion, as to the all-important matter of light for printing. In summer time there is abundance, though one has always to contend against variations in exposure, but in the winter it is sometimes impossible to get a print out of doors, especially in towns and cities, where the

demand for photo-copies exists. In any case, it will be seen that the exposure can never be kept constant when the sun's light has to be depended upon. Hence we find electric light used instead all the year round by firms who are constantly wanting prints. Here, again, however, are difficulties. The light must be evenly diffused. If it is too near the frame one part of the print will be different to the rest, and in addition there is the chance of the glass in the frame being cracked by unequal heating by the lamp, which is nearly always an arc lamp.

To overcome these difficulties a circular printing frame of rolled plate glass has been invented, inside which the lamp descends automatically. This is the patent of Messrs. Hall & Co., who have also introduced an enclosed arc lamp with a long arc that produces powerful ultra-violet rays. Around the outside of the cylinder is a canvas jacket clamped tightly in position. In taking a print, the paper is laid on the tracing and the two rolled up. The canvas jacket is opened, the paper and tracing unrolled against the glass, and the jacket pulled tightly over them. The lamp is then switched on and descends gradually from the top of the cylinder to the bottom, this being repeated once or twice, according to the exposure required: a cyano print can be taken from a tracing in $1\frac{1}{2}$ minutes, an ordinary blue or brown print in 3 minutes, a ferro-gallic print in 8 minutes, and a negative from thick paper in 15 minutes, and results can be got even through Bristol board.

Such an apparatus, then, must be invaluable to any firm constantly in need of photo-copies. The cost ranges from £32 10s. for one of Double Elephant size, while a type with half-circular printing frame specially

intended for architects is listed at £22 Imperial size and £25 Double Elephant.

We think we have now dealt with this subject as fully as need be. The particulars given will enable anyone to decide on which process is the best to adopt in his own case and to figure out the cost of one paper as against another. If, however, any readers have any questions to ask we will endeavour to answer them satisfactorily through our "Enquiries" columns.

TINTERN ABBEY.

Some History and Recent Discoveries.

IN connection with a recent visit of the Woolhope Naturalists' Field Club to Tintern Mr. Philip Baylis read a paper giving an account of the abbey and describing the recent discoveries made there. He said they were standing on the ruin of the Cistercian abbey of St. Mary of Tintern. Having remarked that all Cistercian abbeys were built upon one general principle, he proceeded to relate a few facts concerning the one in which they were assembled.

It was founded in 1131 by Walter de Clare, otherwise Walter Fitz Richard, but the first church had entirely disappeared, and they would notice that there was no architecture of the twelfth century remaining.

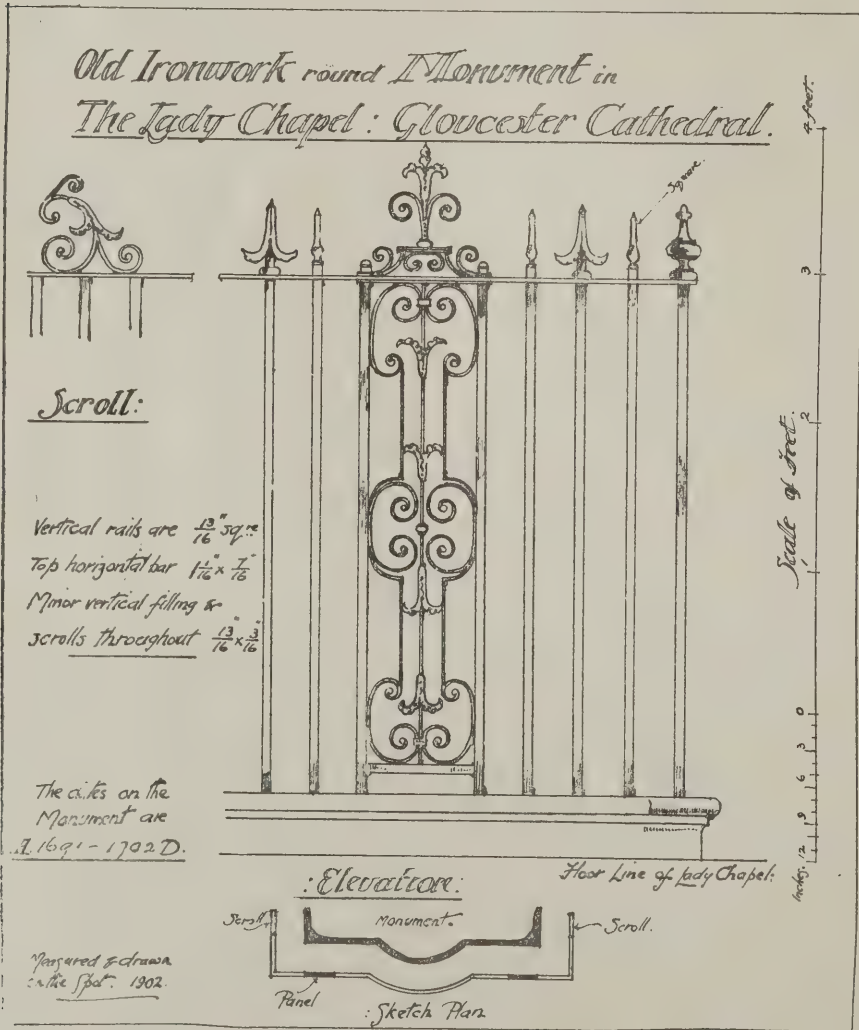
The Cistercians were a reforming branch of the great Benedictine Order. About the end of the eleventh century one Stephen Harding, an Englishman, split off from the Benedictines and an abbey was founded at Cîteaux, in Burgundy—hence the name Cistercians—and from that time they rapidly spread over Europe. The first Cistercian abbey founded in England was either

Waverley or Furness, in 1127 or 1128, Tintern being about the third or fourth. All Cistercian abbeys were dedicated by rule of the Order to the Virgin, and hence a Lady Chapel was seldom to be found in them because the whole church itself was "the Chapel of Our Lady." Still one did occasionally find them, though there was no Lady Chapel at Tintern. Another rule of the Order was that the abbey should be built in a secluded spot. The part on which they were standing was the abbey, and the part frequently but erroneously called the abbey was the abbey church. An abbey was the place where the monks dwelt, and in those days was a community in itself.

As regards the general arrangement of the Cistercian abbeys, there was a "settlement" with the cloisters generally on the south, probably because the south was the warmer and more convenient place; but at Tintern, no doubt on account of the contour of the ground, the "settlement" was on the north side. Passing out of the church through the north transept, they came into the sacristy, adjoining which, and in continuation of it, was a barrel-roofed apartment in which most likely some of the abbey books were kept. Next to that was always the chapter-house, in which were seats on three sides, and the abbot, when presiding, sat at the middle of the east end. Then came the parlour, or place where the monks might talk, because even when they met in the cloisters they were not allowed to speak to one another. Next to the parlour, and still proceeding north, was a passage leading to the infirmary and other buildings belonging to the clerical portion of the abbey community. Proceeding still further north, they came to what was called the monks' dormer, or day-room; "dormer" was an old English word connected with the word "dormitory," though not a sleeping apartment in this case; they found it applied to several parts of the abbey which were not used for sleeping purposes; for instance, the latrines were called "the rere dormers." Over the whole of the buildings which he had mentioned were dormitories, or dormers proper, in which the monks slept, and they could pass through a passage leading over the chapter-house to the doorway in the north transept and thence down into the church for the night services. Passing out of the day-room they came to a staircase leading to the dormitories, and near it was the warming-house, or calefactory. At Tintern until quite recently it used to be called the entrance from the river by people who knew little of Cistercian abbeys. Inside the apartment named stood a hearth, the fire being placed in the centre of the room. Next to the calefactory, in the cloister, and outside the frater, were the lavatories, where the monks washed their hands and feet before going into the frater, or refectory, where they dined.

One noticeable feature about Cistercian abbeys was that the frater (or fratri) ran in its narrowest way from the church, so that there should be the least possible chance of anyone in the church being disturbed by any slight noise in the frater, as would have been more likely if it had run parallel with the nave of the church. A pulpit was always placed in the frater, and from it during the time the monks were at meals one of the brethren would read a portion of Scripture or from the writings of the old Fathers. On the west side of the frater was the buttery hatch, through which the food was passed from the kitchen. Next to the kitchen were the quarters of the conversi, or lay brothers.

The buildings that had been discovered recently at Tintern were probably part of the cellarer's apartments. A cellarer was a very important official in a Cistercian monastery. He was in the position of a steward, and took charge of all the tools, implements and general stores of the place,



so that it was necessary he should have a dwelling to himself and also considerable buildings adjacent. Extending westward they recently came across other foundations, which were probably those of the old bake-houses, and a considerable distance further to the west, at the end of the orchard as they approached the abbey, they found the foundation of a length of walling, which was probably a portion of the gatehouse.

Outside the conversi were the stables, the slaughter-house, the bakehouse, the mill, the granaries, the workshops, the lay brothers' infirmary and many other buildings. On the "cleric" side were the infirmary, the abbot's apartments, the *misericorde*, the guest-house, &c. On the south, the side removed from the "settlement," was an entrance through the south transept for the public when they were admitted; but the abbey was by no means built for the public; they were really intended that the monks might live there by themselves and perform their worship, and it was more as an act of grace that the public were allowed to enter.

The building of the present abbey church of Tintern was commenced about 1269 by Roger Bigod, Earl of Norfolk, and the first service was held in 1287. Mr. Baylis mentioned portions of the building which were twelfth-century work, and referred to the various building operations carried on from time to time, ending with the rebuilding of the cloisters about 1486, in consequence of the gift of William, Earl of Pembroke, but probably the times that were then disturbing the monasteries generally caused them to stop the work, and after the dissolution of the monasteries nothing further was done.

Mr. Baylis then conducted the party through the abbey and grounds, carefully explaining everything of interest. He first drew attention to the discoveries which had been made since the abbey came into the possession of the Crown, first of all pointing out an arch which was discovered near the new entrance, on what was recently the site of a cottage occupied by the caretaker of the abbey. Carrying their investigations further, one or two arches were met with, also a staircase which was hidden by another cottage, and also indications of a roof over the staircase. Mr. Paylis next showed where excavations had been made to a depth of about 5ft., bringing to light an old watercourse which had been previously entirely hidden by the soil that had accumulated. Possibly, he said, it was one of the streams that came from the mill and was used for sanitary and other purposes. It was a very large watercourse, and was entirely silted up to a point which he indicated. There was a very curious diversion of the watercourse, but for what reason no one had been able to say. On the right-hand side, almost embedded in the ground, could be seen the lip of the stone gutter that brought the slops out of the kitchen into the stream. The whole of the ground on the north of the kitchen and frater was until recently a garden, but many hundreds of tons of debris had been removed

and the place opened to the public; from one part of it a very fine view of the abbey was obtainable. Some remains of the old abbey buildings were also observable, and another part that was formerly walled up led to the cloisters. On the site of the old warming-house was one of the few bits of groining left, and in the floors were the bases of four pillars which carried a similar number of arches over the hearth. Only one fireplace was allowed in the abbey, and that for the use only of the weaker brethren during the very cold mornings in winter, when they conducted the early services in the church. They were allowed to come down there and warm themselves for a short time, and the hearth was arranged so as to get the greatest number of monks around it. In the staircase which was used in the daytime by the monks in going up to the dormitories was fortunately left a stone that showed the level of the floor. In the monks' day-room was a wall which had undoubtedly been built against an earlier wall, and Mr. Baylis further mentioned that they had discovered the jambs of an old window. In taking out some loose masonry was found the only herring-bone masonry in the abbey; this was probably the back of a very old fireplace that was there before the abbey took its present form. Mr. Paylis regretfully remarked that all who visited the abbey did not appreciate the ruins as those present would, for since these discoveries had been made someone for sheer mischief had broken off the piece of a jamb, and in the chapter-house more mischief had been done. In the frater or refectory, Mr. Baylis said, they could see where the steps commenced leading to the pulpit. Inside the church one of the finest vistas of arches in the abbey could be seen, looking north from the door in the south transept. Although the whole church was so nearly uniform in style, there were some differences in the masonry, particularly about the windows, which indicated the order in which those parts were built. According to Mr. Thomas Blashill, who had given a great deal of attention to the abbey, the eastern part, the south transept and one bay of the nave appeared to form the part which was first built and used in 1287. The choir was opened in the following year, and three or four of the bays of the nave seemed to be of about the same date. The two westernmost windows in the south aisle, the great west window, the western part of the clearstory, and the whole of the upper part of the north aisle wall showed a change in the details which indicated a later date. The north transept seemed to have been built last of all, for the mouldings of its windows were of advanced fourteenth-century character, and it was spanned by two flying buttresses which supported the groining, being the only flying buttresses used in the abbey.

In conclusion Mr. Baylis explained the general method it was proposed to adopt to preserve the ruins from falling into further disrepair. It was proposed by those who advised the Crown that they should do nothing in the way of restoration in the

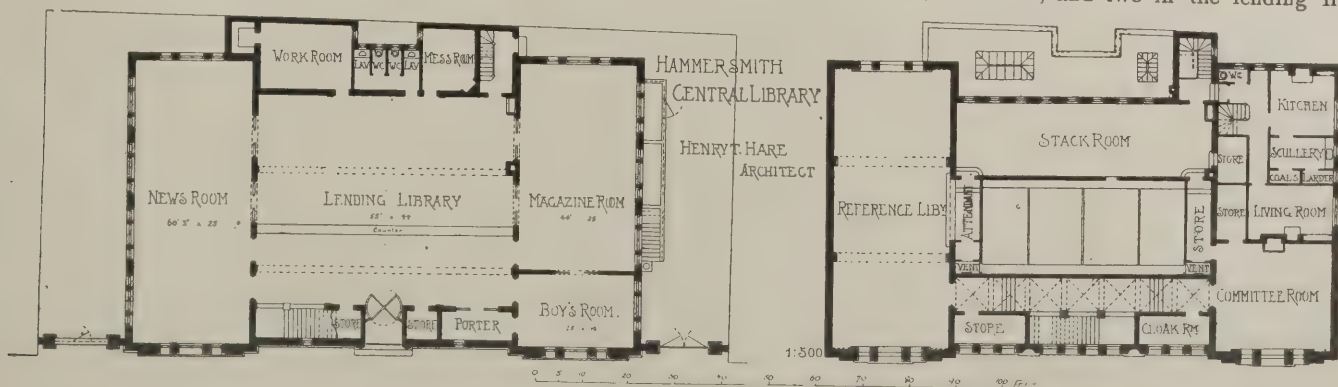
ordinary sense, and that they should only keep as far as they could that which was there and try to prevent it getting into a further state of ruin. They did not please everybody by doing that, and only recently, after filling in one of the large buttresses at the west end, which had been torn out for the purposes of building at one time and another, they received letters complaining of what had been done. At all events they had the approval of those whom they believed knew something about these matters. When they put in new work it was done without any attempt to imitate the old, so that those who came afterwards would be able to say, "This masonry was put in by way of protective work to what was left after the abbey had been partly destroyed."

The work of preserving the ruins of Tintern Abbey, which is being carried out by the Crown authorities, who bought the famous ruin and lands adjoining from the Duke of Beaufort, is proceeding, and the eastern end of the nave is now covered by a forest of scaffolding. This has been erected to permit of supports being placed to the slender central shaft of the big east window, which for some time past has been in great danger of falling. The work now in progress includes the strengthening of the mullions of several of the windows of the nave and the pointing of most of the exterior. Much damage has been done in the past by the percolation of the rain through the interstices at the top of the walls, and the gaps are to be sealed with cement or lead. Some of the masonry at the top of the walls is dangerously loose, and a warning is issued to visitors to beware of falling stones. The preservation scheme includes the fastening of dangerous stones and the removal of others. The famous west window retains its beautiful tracery mullions almost intact; but one or two of the mullions show signs of weakness and will be strengthened. Mr. Waller, of Gloucester, is the architect for the work.

OUR PLATES.

AT Tissington Hall, Derbyshire, Mr. Arnold Mitchell has been making alterations and additions for some years. The pencil drawing (by Mr. Frank Green) shows the house as it now is, together with the lay-out of the grounds.

The central library at Hammersmith is nearing completion. It occupies a rectangular plot facing Brook Green Road and running north to south. The hall, borrowers' space and lending library run parallel to the front, and enclose a space 53ft. in length between the news-room in the north and the magazine-room at the south end of the block. There is a central entrance, with stairs on the north side parallel to the front, and a porter's room on the other side of the entrance. The borrowing hall (which measures 55ft. by 15ft. wide) and lending library are in one large area, with a lantern over both, and two in the lending library



(which latter measures 55ft. by 29ft.). The counter and indicators occupy the entire length of the lending department, and plenty of light is given by the lantern. The transverse wings which form the news and magazine rooms are 60ft. 3ins. by 25ft. internally; the latter is divided into a room for magazines 44ft. by 25ft. and a boys' room in front 25ft. by 15ft. These are well-lighted by end and side windows from side courts, the desks being placed in parallel rows across each room. A lift is provided at one end of the lending library and there are projecting staircases at the ends, a west one being for the caretaker and the other for attendants. A lavatory as required projects into the passage behind lending library in the centre. The upper-floor plan shows a large rectangular well over lending library with a wide landing in front approached from the main stairs, with cloak and store rooms at ends. The landing corridor connects the reference library on the north and a committee room on the corresponding end of the front. Behind the central wall is a large stack room 55ft. by 15ft., lighted from the back court. Near the latter is a place for the attendant, and the supervision of the departments is pretty complete. A mess- and work-room are obtained over the south wing in the rear, with separate stairs. The lending library is arranged for 31,000 vols., at 10 vols. per ft. run of shelving in cases 8ft. high; the reference library for 20,000 vols. at 9 vols. per ft. run. Red bricks and Portland stone are used, with green-slatted roof; fireproof floors laid with wood blocks are provided, and the staircase is of Hopton Wood stone. The heating is by low-pressure hot water, with ventilating radiators.

Keystones.

The Haymarket Theatre, now being reconstructed, is the third of its name, and was built by Nash about 1821.

The F. E. Coe Red Book on Advertising for 1904-5 has just been issued from 19-21, High Holborn, W.C., price 2s. 6d. nett.

Ballsbridge, Dublin, has been widened by 25ft. under the direction of Messrs. Kaye Parry & Ross, civil engineers and architects, Dublin.

The Abbot's House and Regality Tower at Arbroath Abbey are to be taken over by the Board of Works so as to preserve the building and make it more accessible to visitors.

The Parish Church of St. Mary, Petworth, has been reopened after extensive alteration by Mr. Walter E. Tower, architect, and Mr. C. E. Kempe. A new organ has been erected by Messrs. Drindley & Foster, Sheffield, London and Glasgow.

Richmond Hill.—The purchase of the four freehold houses nearly opposite the Star and Garter Hotel, commanding the finest prospect of the view from Richmond Hill, has now been completed by Messrs. Chancellor & Sons for Captain W. B. Marling, so as to prevent the erection of a large block of flats there.

Ordnance Survey.—During 1903-04 the rin. coloured map of England and Wales was completed and a similar map of Scotland has been authorized, while that for Ireland is in progress, about half of it being completed. Rapid progress has been made with the two-mile map of England—the sheets are published for the whole of the south-east portion. The revised four-mile outline map of the United Kingdom and the coloured four-mile map of Great Britain have been completed; also the ten-mile revised map of Great Britain. The 1:100,000 map of the United Kingdom is expected to be published during the current year.

A new Parish Hall at Sunderland is being erected in Fulwell Road in connection with All Saints' Church. Messrs. W. & T. R. Milburn are the architects and Mr. J. R. Birney is the builder. The cost of the building will be £1,500.

A new Asylum for Lancashire is to be erected at Whalley. Mr. Littler, the county architect, who is to design it, has been instructed by the County Asylums Board to visit certain Continental asylums and also some of the recently built English and Scotch asylums.

The Offices of the Cleansing Department of Glasgow have been removed from the City Chambers to the property at the corner of John Street and Cochrane Street recently purchased by the Corporation. The offices have been remodelled under the supervision of the city engineer, Mr. McDonald.

Northern Architectural Association.—A party of members of this Association recently visited Sunderland for the purpose of inspecting the Roker Pier and the new post-office. At Roker particular interest was evinced in the new lighthouse (designed by Mr. H. H. Wake, engineer to the River Wear Commissioners), which contains the most powerful port light in the country. Time not permitting a visit to the new extension of the South Docks, the party returned to Sunderland and spent over an hour in the post-office.

Glasgow School of Art.—The prospectus for the next session, which begins on September 8th, has just been issued. Mr. Adolphe Giralton, a French designer of some note and resident in Paris, has been appointed by the Governors as professor of design and decorative art in the school. With the present session Mr. Eugène Bourdon, B.A., A.D.F.G., architect, will commence to direct the courses of instruction in architecture both in the School of Art and in the Technical College. An exhibition of students' work will be held at the Royal Glasgow Institute of Fine Arts from November 28th till December 10th.

Turton Tower, near Manchester, has been acquired by Sir Lees Knowles. It is suggested that he will revive its ancient glory and importance, or, maybe, he will turn it into the desolation of a museum. The one-time beautiful lawn is running to seed; the rose garden, with its quaint centre column and sundial, has a forsaken look. The gatehouse shows the neglect of years. But its titled owner will put all this right with judicious care, and Turton Tower will for long be of vital interest to architectural students like those connected with the Manchester Society of Architects who, under the leadership of Mr. J. D. Mould, visited it a week or so ago.

Drury Lane Theatre.—After protracted negotiations, the London County Council, with the consent of the Home Secretary, served a large number of requisitions upon the company for alterations and improvements at the theatre. The directors appealed from these requisitions, and Mr. John Slater, F.R.I.B.A., was appointed arbitrator. His award has recently been made, and the works required to be done are now under the consideration of the board. For the purpose of carrying out these works it will be necessary to close the theatre until Christmas. The alterations, which will cost about £12,000, comprise the replacing of the old stage by a new one of hardwood and steel, two distinct installations of electricity for the lighting of the house, three new exits from the gallery, a new ceiling of fibrous plaster, the improvement of the seating accommodation, and the entire removal of all gas fittings and piping from the theatre. Mr. Philip E. Pilditch is the architect.

Seventy-four Artizans' Dwellings at Black-rock, Dublin, have been erected, at a cost of about £17,000, from designs by Mr. Caldback, by Messrs. Lynch & Egan contractors.

Extensive repairs to the Parish Church at Lawshall have been carried out by Messrs. Hinnels & Son, builders, of Bury St. Edmunds.

Improvements at Sandringham.—The Queen, before leaving Sandringham for Scotland, congratulated the contractors upon the results of the work they have accomplished in the alterations and decorations at the house.

New Churches at Chapel-en-le-Frith, Derbyshire, are to be provided, two from designs by Mr. C. W. Johnson—one, now in course of erection, being at Bugsworth and the other at Whitehough, near Chinley. The third is also to be at Chinley.

The famous high mill at Yarmouth—the highest in England—was sold last Wednesday for £100, though it cost £10,000 to build in 1812. The mill is circular and comprises twelve floors, its cap being 120ft. from the ground.

The Victoria Infirmary, Northwich, is being extended at a cost of £5,000, as a memorial to Queen Victoria, from designs by Mr. C. E. Bolshaw, architect, of Southport and Crewe. The new buildings will be in the picturesque Cheshire half-timbered style.

Leeds Architects ask for Preference.—The Leeds and Yorkshire Architectural Society recently wrote to the Leeds Board of Guardians urging that in the erection of any new buildings in connection with the Union the claims of Leeds architects should have consideration.

An Isolated Hospital at Pontypriid has just been erected at a cost of £6,700 from designs prepared by Mr. Edward Rees, late surveyor to the district council, acting in conjunction with Dr. Howard Davies, the medical officer of health. The contractor was Mr. William Davies, of Hopkinstown. Mr. W. J. Davies, of Pontypriid, was the clerk of works.

Tideswell Church Restoration.—One of the most important features in connection with the restoration of the ancient church at Tideswell has just been completed, namely, the removal of the modern gallery and porches which completely spoiled the west end. The fine west window, the groined arch, and the tower arch now stand out as boldly as when first completed 500 years ago. Mr. J. Oldrid Scott, of London, is the architect, under whom the work is being carried out.

Business Premises in Halifax for Messrs. Alex. Scott, Ltd., in association with Messrs. Kirby, Nicholson & Co., have been erected in Commercial Street and King Edward Street from designs by Mr. W. Clement Williams, F.R.I.B.A. The contractors were:—Masonry, Messrs. Crawshaw & Sons, Ripponden; joinery, Messrs. Moore & Sons, Claremount; plumbing and glazing, Mr. T. Boocock, Halifax; fibrous plaster ceilings and painting, Messrs. Jonas Binns & Son; iron and steel work, Messrs. Wood & Co., Manchester; and plastering, Mr. Bancroft, Halifax.

At Kettering Workhouse a new consumption hospital has been erected, and extensions made to the chronic block and nurses' home. The consumption hospital is a one-storey building 150ft. by 32ft., with accommodation for twenty beds. Large windows are provided all along the north side, and on the south are openings 10ft. wide leading out on to a veranda. The architects were Messrs. Gotch & Saunders, the contractors being Messrs. C. & F. Henson; while the plumbing work was done by Messrs. Cooper & Sons, of Kettering, and the heating apparatus and hot-water supply installed by Messrs. Ashwell & Nesbit, of Leicester.

SIMPLON TUNNEL:

Expected to be through in October.

MSULTZER ZIEGLER, who is well known in connection with the Simplon Tunnel, gave a lecture last week before the Swiss Society of Natural Sciences in which he made some interesting statements concerning the progress of this gigantic enterprise. He explained the methods for piercing the Alps, and particularly the novel system which has been adopted. This consists of two distinct parallel single-track tunnels 56ft. apart, but connected every hundred yards by transverse galleries, so that one tunnel will ventilate the other. M. Ziegler went on to state that it had been hoped to complete the tunnel in five years and a half. The work of piercing was commenced in August, 1898, on the Italian and Swiss sides simultaneously, and the estimated rate of progress had been exceeded on the north side, the work having been completed two months before the fixed time. On the south side great difficulties had had to be overcome. It was thought that the mountain was composed of vertical strata, but horizontal beds had been met with instead. These had demanded enormous labour; great rushes of water had likewise to be stopped. At one time the situation was really critical, for the engineers came upon a bed of moving earth about 500 yds. long which threatened to block the part of the tunnel already drilled; the pressure was so great that enormous wooden supports were broken, and in the end the tunnel had practically to be armour-plated, forty-four strong iron columns being employed to hold the roof up. Instead of making an estimated daily progress of 18ft., the tunnel advanced less than 1ft. a day, and it was only after ten months of dogged and dangerous work that the difficulties were finally overcome. Since then rapid progress had been made, and at the commencement of August 4,593ft. only remained to be pierced of the twelve miles and a quarter, which is the total length of the tunnel. If nothing untoward happened, M. Ziegler said he hoped that early in October the workmen from the Swiss side would join hands with their comrades from Italy beneath the centre of the mountain.

PROPOSED BARRAGE OF THE THAMES.

BEFORE the Engineering section of the British Association last Wednesday Mr. James Casey read a paper on the proposed barrage of the Thames. He said that in order to remove the inconveniences and difficulties attending the navigation of the Port of London he proposed to construct across the river at Gravesend to Tilbury a dam or barrage similar to that across the Nile. The foundation of the dam would be in the chalk and would be granite and mass concrete, with a roadway on top. The dam would be provided with four locks. The great advantage of this would be that instead of waiting for tides at Gravesend each vessel as she arrived could be locked in a few moments and enabled to proceed to London without delay. The lock would be worked by electricity obtained from dynamos driven by the fall of water flowing over the dam. If such a dam were built the present docks would be accessible at all hours of the day or night, the unsightly and foul-smelling mudbanks now laid bare twice a day would no longer disfigure the river; a fresh-water lake forty miles long would be available for boating and pleasure traffic; and a supply of water would be provided for the new Water Board without going to Wales at a cost of twenty-four millions for any additional supply;

moreover, the extension of works on both banks of the river would afford facilities for employment to the working population, and so relieve the congestion of the East End. In connection with the dam Mr. Casey proposed to construct a tunnel, connected with the railways in Essex and Kent, which would enable the military and naval authorities to utilize their base and warlike stores at present in Woolwich, Sheerness and Chatham, should the necessity arise for same, on our north-east coast. From a strategic point of view the dam would afford a valuable solution of the question of the Thames defence by effectually blocking the river, and incidentally it would provide a grand harbour for the Fleet. Lastly, the cost would be only four millions, as against thirty-seven millions proposed, besides which must be set off prospective enormous outlay for water-supply, reservoirs and other matters which would become unnecessary if this scheme were adopted.

THE OLD TOWNS OF GERMANY.

How their Appearance is Preserved.

ANYONE who remembers Cologne when the city was still confined within its mediæval *enceinte* and who spends a few hours to-day in its electric tramcars, receives an object-lesson in city expansion of a most striking kind. Thoughtful and patriotic citizens who saw the traditional aspect of the cities of the Fatherland dissolving before their eyes were wounded in their historic sense and in their affection for home. From this has arisen a powerful movement, dating from about five years back, the tendency of which may be summed up in the word recently adopted as the title of a patriotic society—"Heimatschutz," or "The Defence of Home." As our neighbours across the North Sea are nothing if not systematic, they have taken up and discussed these questions with characteristic thoroughness. An annual congress, under the title "Tag für Denkmalspflege," or "Meeting for the Care of Monuments," is held in different towns of the Empire, and a special journal, the organ of the movement, gives every month a chronicle of all that is tried or accomplished for the cause, in Germany or abroad, either by legislation or by private agency.

Action is taken to preserve the general appearance of the streets, or, as the Germans say, the "staltbild" and the "strassenbild." The primary agency, without which all others are of secondary value, is the good will of the citizens. When these have been brought to see that the cause is really their own, the essential condition of success has been secured. An inventory of buildings and objects of historical and artistic value is, of course, an essential part of the plan, and it is rightly felt that structures which would never find their way into a limited State inventory, such as the list of the "Monuments Historiques" in France, may yet be of great local importance as elements in the general effect of a town. There is a city museum, but objects are only admitted when it is quite impossible to preserve them in their original surroundings.

At Brussels all the old houses around the Grande Place have passed into the possession of the town. Hildesheim also (described and illustrated in *THE BUILDERS' JOURNAL* for August 17th last) has saved in this way the aspect of its old market-place, and has bought up valuable houses sometimes at a price of five or six thousand pounds apiece. These are not, of course, allowed to stand empty, but are used for various public purposes or are let to tenants. To influence public taste in the case of new buildings, a measure was adopted at Hildesheim which has been copied in other German cities.

This is the institution of a competition for architectural designs for houses, or rows of such, in the traditional style characteristic of each city. Bremen, Lübeck, Köln, Trier, Danzig have followed the example. It is obviously not always possible to secure that a private owner shall preserve the ancient appearance of his house or adhere to the characteristic style in alterations or rebuilding. Where there is goodwill but a lack of means, the Society steps in with a moderate contribution from its funds. During the first four years of its existence this Society came to the aid of nearly 120 houses. The city also in such a case may make the occasion one for purchase.

Where goodwill is at fault there arises at once the important question of compulsion. The exercise of compulsion on æsthetic grounds can hardly be said to come as yet within the British circle of ideas, though on other grounds the principle of limiting the freedom of the individual in the interests of the community is in constant operation. Direct State legislation for the protection of old monuments exists in a certain number of European countries, though by no means in all. Of such Acts, that of Greece, 1834, is the first in point of time; that of France promulgated in 1887, the most important; while the latest are those of Italy, of the Grand Duchy of Hesse, and of the cantons of Bern and Neuchâtel in Switzerland, all of 1902. Even Great Britain has its "Ancient Monuments Act" of 1882, to which an important addition was made in 1900.

The different German States possess Local Government Acts old and new, and under these the urban communities have power within certain limits to make their own by-laws. The cities interested, with Hildesheim at their head, have issued regulations of æsthetic import in a somewhat detailed and stringent form. Hildesheim, Nürnberg, Augsburg, Rotenburg, Würzburg, Frankfurt, Bamberg and other cities possess these regulations, but the fact that they represent a certain stretching of existing Local Government Acts to suit a purpose not fully contemplated when those Acts were passed authorities to maintain the ancient appearance in opposition to the efforts of the municipal and added that there was to be "no more of the interior, who upheld their contention, these then appealed to the Bavarian Minister instance decided against the magistrates, brought into Court, and the judge of first their local regulations. The matter was by the magistrates on the ground of act of vandalism at Bamberg was forbidden will on their side. In 1899-1900 a projected Bavarian cities seem to have the general law warily in the exercise of their powers. The readers it necessary for the towns to proceed briefly, these regulations forbid any buildings enforcement of their local regulations. Put Interior to proceed with caution in the enforcement advised by the friendly Minister of the law is not so elastic, and the Hildesheimers parts, and especially in Prussia, the general interested parties. On the other hand, in other upheld by the Minister, though contested by case at Nürnberg, in 1899 civic action was act of the city." In a somewhat similar to be put up or altered in the central districts of the city in such a way as to be out of accord with the existing surroundings, and Burgmaster Struckmann reported in 1902 that in Hildesheim on no single occasion had these regulations been resisted, and that they had worked in a most beneficial fashion.—(Extracts from an article in the "Scotsman.")

The Union Bank Premises at Aberfeldy have been rebuilt after the fire which gutted the old building eighteen months ago. The plans for the reconstruction were prepared by Mr. William Bell in conjunction with Mr. Rhoderic Cameron, architects, Aberfeldy.

Builders' Notes.

Employment in the Building Trades was (according to returns) generally dull during July and rather worse than in 1902.

A new Building Estate at East Pentire, Newquay, Cornwall, is being developed. Mr. John Ennor, jr., is the architect for the estate.

New Premises for the "Dundee Courier" are being erected. For the foundations a number of Hennebique ferro-concrete piles are being driven in. Messrs. J. Howe & Co., of West Hartlepool, are the contractors.

The Extensions to the Isolation Hospital, Neasden, are being warmed and ventilated by Shorland's double-fronted patent Manchester stoves with descending smoke flues, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

In the Birmingham Corporation Water-works the whole of the Portland cement used was not supplied from firms in the Combine, but Messrs. The Saxon Portland Cement Company, Ltd., of Cambridge, and other firms furnished thousands of tons of cement.

Quick Railway Bridge Work.—In six hours the large timber trestle viaduct on the Peebles branch of the North British Railway was replaced by a new steel girder bridge on August 21st. Each of the two main girders weighed 22 tons and were 82ft. long by 7½ft. deep.

A new Graving Dock has been constructed at Hebburn, Durham, by Messrs. McAlpine & Sons, Glasgow, for Messrs. Robert Stephenson & Co., engineers and shipbuilders. It was commenced more than four years ago and has cost about £250,000. It is the largest dock on the north-east coast, its chief dimensions being: Length 700ft., width at caisson goft., and at coping 111ft.

Iron and Steel.—Mr. Schwab says that within ten years the consumption of steel in the United States will exceed 20,000,000 tons. This is greater than the combined capacity of all the steel plants in America at the present time. This tremendous increase offers some prospect that "dumping" methods may cease when the home trade again becomes active.—Birmingham reports state that the demand for constructional iron and steel is well maintained owing to the requirements of railways, &c., but the ordinary builders' material trade is quiet.

Master House-Painters' and Decorators' Exhibition.—An exhibition of decorative art, design, processes, materials, &c., is to be held at St. James's Hall, Manchester, next month under the auspices of the National Association of Master House-Painters and Decorators of England and Wales Incorporated. The proceeds will be devoted to the educational work of the Association. Mr. Alfred Hopkinson, K.C., LL.D., Vice-Chancellor of the Victoria University, will open the exhibition on Tuesday, September 20th, when the Lord Mayor of Manchester will preside.

New York Building Strike.—The anti-unionism of the masters in the building trade that they had beaten the men has not been realized, for the "open shop" clause in the arbitration agreement has given offence to the unions and the strike has been renewed in greater force. The strike leaders last week decided to call out fourteen additional building unions if the "open shop" clause was not abandoned. If this measure is resorted to over 100,000 carpenters and builders will be idle. The unions seek to establish a "union shop" clause, which means that all work put into a building shall be the product of union labour and the

masters have locked the men out against this.

The Premises of Messrs. Wilson & Co., builders and merchants, High Road, Tottenham, were destroyed by fire on Sunday morning. The buildings, some of which were three storeys high, covered about half an acre of ground and contained a large stock, including oils, paints and other inflammable materials.

The Trades' Training Schools.—The judges' report on the work done during the past session at the trades' training schools of the Worshipful Companies of Carpenters, Joiners, Painter Stainers, Plaisterers, Tylers and Bricklayers, and Wheelwrights, at 153, Great Titchfield Street, W., has just been issued. The judges are pleased to find that the work shows distinct improvement in almost all the classes. In the painters' class the decorative work exhibited a marked advance. The plasterers' class is reported as satisfactory, though it is suggested that the designs should be more plastic in character and that more should be made of modelling. With the work done in the plumbers' class the judges are a little disappointed, but they praise that of the smiths', tylers' and bricklayers', wheelwrights' and stone-carvers' classes—especially the last, Mr. John Belcher and Mr. Roscoe Mullins observing that "the works in relief are all better than the studies in the round and show the influence of good teaching." In regard to woodcarving the judges point out that the surface is frequently spoiled by being smoothed. The report is illustrated with numerous photographic reproductions of work done in the classes—such as a small-scale timbered spire rising over four hammer-beam trusses, a gantry, a staircase, stone doorway, &c.

German Stonemasons: Their Wages, Hours, &c.—After a strike between the master masons and the operatives at Freiburg, Germany, the following agreement has been arrived at. It will be seen that a German mason, working eight hours a day, earns 24s. per week:—Daily hours of labour for stonemasons: From January 1st to February 15th, eight hours; February 15th to October 31st, nine hours; November 1st to December 31st, eight hours. From February 15th to November 1st the work shall cease on the pay Saturday at 5 o'clock in the evening. The labours of the stonemasons may be performed by contract or by the hour, according to agreement. If the work is done by the hour the pay per hour for a good stonemason shall be at least 50 pfennigs (5½d.) per hour. The pay for apprentices and others of less ability than a first-class stonemason shall be according to agreement. Wages to be paid on two weeks' time every second Saturday immediately at the close of the work-day. The relation of employer to workman can be broken by either side without notice. Each stonemason shall receive from his master a complete set of necessary working tools. With the exception of the several daily pauses, the use of intoxicating drinks is forbidden during the work-day. Furthermore, the workmen are not allowed to congregate and talk during the work-day or remain away from the work without proper excuse. Workmen who disregard these requirements can be immediately dismissed. No discrimination shall be made because of membership of any organization. For proper settlement of differences between employers and workmen three representatives from each side shall constitute a committee to arbitrate and arrange difficulties and misunderstandings. All judgments of this committee shall, however, be voted on at the general meetings of both sides, and if no agreement can be reached then the trade tribunal (Gewerbe-gericht) shall be called upon. Up to this point strikes and lock-outs cannot be allowed.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Books on Mortuaries.

LLANTARNAM, MON.—S. F. L. F. writes: "Are there any recent books on the designing of public mortuaries?"

We know of none.

Articles on City Churches.

LONDON, E.C.—J. G. writes: "When did the articles on 'The City Churches' appear in the BUILDERS' JOURNAL?"

The articles on "The City Churches" appeared in our issues for December 16th, 1903, and January 13th, February 10th, March 2nd and 30th, and May 18th, 1904.

A Classic Lectern.

LONDON, N.—C. H. H. writes: "Do any of the London churches contain a Classic lectern (not Gothic), and would one be allowed to photograph or sketch and measure same?"

The lectern in St. Margaret's, Lothbury, is illustrated in our issue for May 18th last. Permission to photograph or sketch it can be obtained on application to the rector.

Card Indexes.

LIMERICK.—N. A. S. writes: "Please give (1) name and address of two or three firms who deal with the most 'up-to-date' office requisites, such as card indexes and methods of filing correspondence, &c.; (2) names, &c., of any books on the subject; (3) price of Kelly's Directory of the Building Trades."

(1) The Shannon, Ltd., 13-16, Ropemaker Street, London, E.C.; Partridge & Cooper, Ltd., 191 and 192, Fleet Street, London, E.C.; Robsons, Ltd., 42, Northumberland Avenue, Newcastle-on-Tyne. (2) We know of none. (3) 30s. nett.

"Uralite" Competition.

ALNWICK.—G. H. S. writes: "Can you state the probable date when the result of the 'Uralite' competition will be announced?"

We are informed that in consequence of the large number of designs submitted, and the fact that the judges are well-known busy men, it will be some considerable time before the competition will be decided. A probable date cannot be given for the announcement of the result for two months yet.

Situations in South Africa.

BOURNEMOUTH.—F. H. writes: "(1) Do you consider South Africa to be a good opening for a young man, aged twenty-two, who has just finished serving his time as architect and surveyor in England? (2) What position do you think he ought to take out there—an assistant's with a view to starting on his own? (3) How could I get the names of building papers out there to advertise in, and also names of architects to write to? (4) What is the best means of trying to obtain a position, in the interior, up near Johannesburg? (5) What are the qualifications most necessary for practice in South Africa? (6) Has New Zealand any advantages over South Africa as regards opening and prospect?"

(1) In a few years' time. At present there is more than sufficient labour to supply the demand in almost every profession and trade. (2) The best plan is to act as an assistant for about a year until you have a knowledge of local conditions, and then to start in practice for yourself. In the colonies architects often have to be their own

contractors and require some capital. (3 & 4) There is no paper for the building trades yet published in South Africa. This journal has the largest circulation in Africa, and offers a good medium for advertizing for situations. It would be as well also to advertize in the "Cape Times," the leading daily paper in South Africa, and to write to firms of architects (whose names would be difficult to obtain unless you can consult a directory at the Crown Agents for the Colonies). (5) General all-round knowledge and considerable experience of practical building work. (6) New Zealand offers far better chances than South Africa.

Rural By-laws.

MANSFIELD.—J. G. writes: "In 1896 new by-laws for this town were made and were approved by the Local Government Board. Previous to 1896, and under the then existing by-laws, the public were permitted to make the horizontal part of the attic ceiling of a dwelling house one-third the floor area at a height of 8ft. from floor to ceiling. Under the new by-laws (*i.e.*, 1896, and now in force at the present time) the same portion of the ceiling has to be two-thirds of the floor area and 9ft. from floor to ceiling. The increased cost of this construction must be obvious to everyone in the trade. I may add that this item is only one in many which adds to the cost of cottage building. Am I not right in thinking that the Local Government Board will grant any town council permission to alter existing by-laws of their borough to suit local conditions? I believe I have seen it stated as such in the columns of your journal in connection with a particular town where such permission was granted."

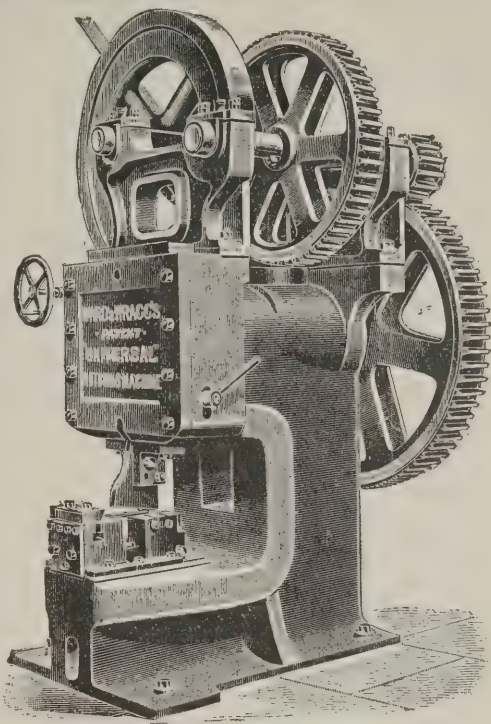
Yes; the Local Government is much more lenient in such matters than formerly, and is doing its best to remedy the evil effect of its old far too stringent model by-laws which form the basis of most local by-laws and have issued fresh sets of by-laws for both urban and rural districts. As regards attics there is no special clause governing them in these Model By-laws such as you refer to, and we therefore think the Local Government Board would raise no objection to its modification. The stringent character of most by-laws is traceable to the fact that previous to the Act of 1890 a rural district council could not make building by-laws unless it became an urban council under the Public Health Act, 1875, which confers on such bodies only the power of making by-laws which, of course, are only suitable to towns. Now, however, under Part III. of the Act of 1890, a rural council can make by-laws, the model for which, published by the Local Government Board, is very reasonable.

Articles on Carpentry and Joinery and Building Construction, and Books on the Renaissance.

HORLEY.—S. J. writes: "(1) Please state the numbers, and the subjects dealt with in the particular numbers, of articles on Practical Carpentry and Joinery by George Ellis, and articles on Practical Building Construction which were published in THE BUILDERS' JOURNAL. (2) Also advise me as to some good works, chiefly for office reference, on Italian and French Renaissance ornament and on English Renaissance architecture."

(1) Mr. Ellis's articles on Practical Carpentry and Joinery appeared as follows:—(1 and 2) Timber, September 8th and 15th, 1897; (3) Timbering in Excavations, September 29th; (4) Shoring and Scaffolding, October 6th; (5) Roof-Trusses, October 27th; (6) Mansard and Hammer-beam Trusses and Gutters, November 17th; (7) Floors, December 29th, 1897; (8) Dancing Floors and Flooring, January 26th, 1898; (9) Partitions, February 16th; (10 and 11) Centering, March 9th and 16th; (12 and 13) Doors, April 20th and 27th; (14 and 15) Door Frames and Finishings, June 1st and 8th; (16, 17, 18 and 19) Windows, July 27th, August 3rd and 10th, September 14th; (20 and 21) Shutters, October 5th and 12th; (22 and 23) Stairs, November 2nd and 9th, 1898; (24 and 25) Shaped or Curved Work, January 25th and February 1st, 1899. Two series of articles on building construction have appeared in our columns. The first, consisting of fifteen articles, commenced with the issue for September 25th, 1901, and concluded with the issue for February 26th, 1902; and the second, comprising nine articles, began on November 12th, 1902, and concluded on May 6th, 1903. (2) "A Handbook of Ornament," by Hugh Stannus (price 10s. post free from our offices). For English Renaissance Architecture, Blomfield's or Gotch's books (see our No. 2 Book List).

Proposed Memorial to Mr. Inderwick.—A movement is on foot among the late Mr. Inderwick's legal and political friends to secure a memorial in the parish church at Winchelsea, where for over a quarter of a century he worshipped, and where his son is one of the honorary secretaries for the restoration, the work of which has been entrusted to Mr. Micklethwaite, who succeeded the late Mr. Pearson as architect at Westminster Abbey. Mr. Inderwick (who was a Fellow of the Society of Antiquaries) secured the preservation of what ancient coloured glass there was left in the parish church, and placed it in a window in the north aisle at his own expense.

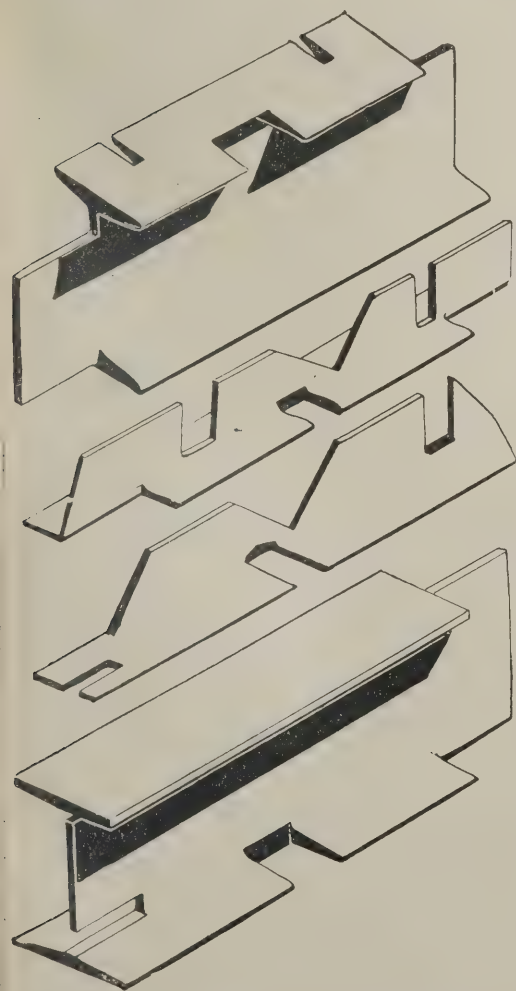


A NOTCHING MACHINE FOR GIRDERS, ANGLES, TEES, ETC.

Trade and Craft.

Notching Steel Sections.

A very useful machine that effects economy in one branch of structural engineering has been patented and is being put on the market by Thomas W. Ward, Ltd., Albion Works, Sheffield. This machine is styled Ward & Wragg's Universal notching machine, and from the variety of notches it will cut in sections of joists, angles, tees, &c., the name is very appropriate. It is a tool which in shipyards, constructional steelworks, bridge building, tank and boiler-making works, will effect much saving of labour, as a large amount of work can be got through without the changing of tools. It is of the heavy punching and shearing machine type, with a particularly deep gap, the gap being made to receive special tools, which tools consist of steel blocks having several cutting edges, all of which are movable to allow for the cutting of various notches, but a special feature of the machine is that a large and varied number of notches can be cut without changing tools and it is only necessary to change these for a few special notches. Such change of tools, however, only occupies a few minutes. In a shipyard or constructional ironworks a large amount of notching has to be done by cold saws or a smith, which, as everyone will realize, is an expensive item, but when the "Universal" notching machine is in use nearly all the sawing is done away with so far as notching is concerned. Below we give a general description of the work the machine will do. It will notch all sections of joists up to 10ins. by 5ins., in any required shape to suit any connection. The machine will notch, sever or bevel all sections of tees and angles up to 6ins. by 6ins. by $\frac{3}{4}$ ins. It will notch or sever all sections of channels up to 12ins. by 4ins. The work is all cleanly cut and requires no smithing after leaving the machine. A view of the machine is given on this page, together with an illustration showing typical cuts in joists, tees and angles from original specimens made by the machine. A machine can be seen in operation any day (by appointment) at Albion Works, and further particulars will be supplied on application to Messrs. Thomas W. Ward, Ltd., Albion Works, Sheffield.



SPECIMEN OF NOTCHES IN STEEL SECTIONS MADE WITH THE MACHINE.

Complete List of Contracis Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Sept. 1	London, N.—Additions to Workhouse	Guardians	W. Smith, 65 Chancery Lane, W.C.
" 1	Bristol—Foundations, &c.	Electrical Committee	H. F. Proctor, Electrical Engineer, Temple Back, Bristol.
" 1	Crookhaven, co. Cork—Coastguard Station		Queen's College, Cork.
" 1	Ponterwyd, Wales—Repairing Schools	Cwmrheidol School Board	T. Morgan, Ty'nffordd, Ponterwyd.
" 1	Penlstone—Sanitary Annexe	Urban District Council	G. A. Wilde, 9 Bank Street, Sheffield.
" 2	Strood, Kent—Greenhouse	Joint Burial Committee	A. B. Acworth, 114 High Street, Strood.
" 2	Downpatrick—Improvements to Gasworks	Committee of Management	Resident Medical Supt., Down District Asylum, Downpatrick.
" 2	Lowestoft—Covered Markets, Pump House, &c.	Great Eastern Railway Co.	Engineer, Liverpool Street Station, E.C.
" 2	Mansfield—Schools	Education Committee	Vallance & Westwick, Architects, Mansfield.
" 3	Titcombe Fosbury, Wilts—School	Education Committee	County Surveyor, County Office, Trowbridge.
" 3	Londonderry—Cottages	Rural District Council	N. A. Robinson, Engineer to Council, Richmond St., Londonderry.
" 3	Nantmoel, Ireland—Chapel		E. Davids, Postmaster, Nantmoel.
" 5	Chelmsford—Foundations	Town Council	T. Dixon, Town Clerk, Chelmsford.
" 5	Ilkley—Library, &c.	Urban District Council	W. Bakewell, 38 Park Square, Leeds.
" 5	London, S.E.—Alterations to Town Hall	Bermondsey Borough Council	Town Hall, Spa Road, S.E.
" 5	Southend-on-Sea—Extension to Masonic Hall	Masonic Hall Club Co.	J. Thompson, Preston Road, Southend.
" 6	Ponders End—Additions to School	Enfield Education Committee	G. E. T. Laurence, 22 Buckingham Street, Adelphi, W.C.
" 6	Ponders End—Block of Schools	Enfield Education Committee	G. E. T. Laurence, 22 Buckingham Street, Adelphi, W.C.
" 6	Richmond, Surrey—Enlargement of Post Office	Commissioners of H.M. Works and Public Buildings	H.M. Office of Works, Storey's Gate, S.W.
" 6	Barking, Essex—Seventy-two Cottages	Urban District Council	C. J. Dawson, Architect, East Street, Barking.
" 7	Dublin—Additions to Buildings	Guardians	J. P. Conden, Clerk to the Guardians, James Street, Dublin.
" 7	Walsall—School Buildings	Governors of Queen Mary's School	Bailey & McConnal, Architects, Bridge Street, Walsall.
" 8	Ipswich—Wards	Guardians	Brown & Burgess, 1 Princess Street, Ipswich.
" 8	Penygraig, Wales—School	Rhondda U.D.C.	J. Rees, Hillside Cottage, Pentre.
" 9	Barrow-in-Furness—Coastguard Buildings	Admiralty	Director of Works Department, Admiralty, 21 Northumberland Avenue, W.C.
" 9	Hove—Coastguard Buildings	Admiralty	Director of Works Department, Admiralty, 21 Northumberland Avenue, W.C.
" 9	Fifeness—Coastguard Buildings	Admiralty	Director of Works Department, Admiralty, 21 Northumberland Avenue, W.C.
" 12	Cwmbran, Mon.—Chapel	Congregational Church	W. T. Phillips, Emporium Buildings, Cwmbran.
" 12	West Hanwell—Public Library	Urban District Council	P. J. Dennis, Council Offices, West Hanwell, W.
" 12	Torquay—Chimney Shaft	Town Council	H. A. Garrett, Borough Engineer, Town Hall Chambers, Torquay.
" 12	Upper Houghton Regis, Dunstable—Church		F. W. Bartens, Winfield Street, Dunstable.
" 13	Liverpool—Post Office	Commissioners of H.M. Works	H.M. Office of Works, Storey's Gate, S.W.
" 13	Epping—Council Buildings	Urban District Council	G. J. Creed, Clerk to Council, Epping.
" 15	London, S.W.—Convenience	Lambeth Borough Council	H. Edwards, 346 Kennington Road, S.E.
" 17	Treviles—Completion of Farmhouse		S. Hill, Architect, Green Lane, Redruth.
ENGINEERING:			
Sept. 1	Leeds—Reservoir	Corporation	City Engineer's Office, Municipal Buildings, Leeds.
" 2	Lowestoft—Quay Walls, Roads, Water Service, &c.	Great Eastern Railway Co.	Engineer, Liverpool Street Station, E.C.
" 2	Tavistock—Boiler	Guardians	J. D. Johnstone, Clerk, 1 Church Lane, Tavistock.
" 3	Brussels—Railway Line		La Bourse, Brussels.
" 3	Ruabon, Wales—Waterworks	Brymbo Water Co.	Engineer, Brymbo Water Co., Ruabon.
" 3	West Wellow, near Romsey—Bridge	Rural District Council	J. Allsop, Clerk, The Abbey, Romsey.
" 5	Beckenham—Fire Engine, &c.	Urban District Council	J. A. Angell, Surveyor, Beckenham.
" 5	Dublin—Motor Cars	Great Northern Ry. Co. (Ireland)	T. Morrison, Amiens Street Terminus, Dublin.
" 5	Bicester—Waterworks	Urban District Council	A. F. Phillips, 38 Parliament Street, Westminster, S.W.
" 5	Pembroke—Storage Tank		R. D. Lowless, Town Clerk, Main Street, Pembroke.
" 6	London E.—Heating	Stepney Sick Asylum District	J. & W. Clarkson, 136 Poplar High Street, E.
" 6	Wicklow, Ireland—Water Main Sewer, &c.	Urban District Council	Town Clerk, Town Hall, Wicklow.
" 7	Woolwich—Heating	Guardians	T. Cutter, Clerk, 30 Rectory Place, Woolwich.
" 7	Berkeley Road, Glos.—Loop Line	Great Western Railway Co.	Engineer, Paddington Station, W.
" 8	Rothwell, Northants—Purifier	Urban District Council	F. Mayall, Deputy Clerk, Market House, Rothwell, Kettering.
" 8	Karlsruhe—Rolling Stock		Directorate General of Railways, Karlsruhe.
" 10	Radcliffe, Lancs—Footbridge	Urban District Council	W. L. Rothwell, Engineer to the Council, Radcliffe, Lancs.
" 12	London, N.—Scarifier	Edmonton U.D.C.	Engineer, Town Hall, Lower Edmonton.
" 14	Sunderland—Railway and Bridge	North Eastern Railway Co.	C. A. Harrison, Central Station, Newcastle-on-Tyne.
Oct. 4	London, S.W.—Pumps, Motors, &c.	London County Council	County Hall, Spring Gardens, London, S.W.
" 4	London, S.W.—Electric Car Traversers	London County Council	County Hall, Spring Gardens, S.W.
" 4	London, S.W.—Condenser, Piping, &c.	London County Council	County Hall, Spring Gardens, S.W.
IRON AND STEEL:			
Sept. 5	Cardiff—Fencing	Corporation	W. Harper, Borough Engineer, Cardiff.
" 6	Newburn-on-Tyne—Fencing, &c.	Urban District Council	T. Gregory, Newburn-on-Tyne.
" 12	Norwich—Ironwork	Markets Committee	A. E. Collins, City Engineer, Guildhall, Norwich.
" 13	Hanwell—Lamp Columns, &c.	Urban District Council	U.D.C. Offices, Hanwell, W.
PAINTING AND PLUMBING:			
Sept. 1	Steinforth, Yorks—Painting		J. Dyson, Clerk to the Council, Steinforth.
" 5	Gravelly Hill, near Birmingham—Painting, &c.	Guardians	Union Offices, Vauxhall Road, Birmingham.
" 10	Berkhamstead—Painting, &c.	Guardians	C. H. & N. A. Rew, Architects, Berkhamstead.
" 10	Stanwix, Carlisle—Painting	Burial Board	Curator, Stanwix, Carlisle.
ROADS AND CARTAGE:			
Sept. 1	Gateshead—Street Works	Town Council	N. P. Pattinson, Borough Surveyor, Town Hall, Gateshead.
" 1	Hartlepool—Road Works	Corporation	H. C. Crummack, Borough Engineer, Hartlepool.
" 1	Prestwich, Manchester—Repaving, &c.	Urban District Council	Surveyor's Office, Chester Bank, Prestwich.
" 3	Stamford—Granite	Town Council	F. R. Ryman, Borough Surveyor, 8 St. Mary's Street, Stamford.
" 3	Heswall, Cheshire—Road	Wirral Rural District Council	T. Davies, 33 Kingsland Road, Birkenhead.
" 3	Houghton-le-Spring—Street Works	Urban District Council	J. W. Holbrook, Surveyor, Houghton-le-Spring.
" 5	Hitchin, Herts—Granite, &c.	Urban District Council	W. O. Times, Clerk, Town Hall, Hitchin.
" 5	Handsworth, Staffs—Lane Works	Urban District Council	Surveyor, Council House, Handsworth.
" 5	Mountain Ash, Wales—Road Materials	Urban District Council	W. G. Thomas, Surveyor, Mountain Ash, Wales.
" 5	Royston, near Barnsley—Asphalting	Urban District Council	Council Offices, Royston, near Barnsley.
" 5	Stamford—Kerbing and Flagging	Corporation	F. R. Ryman, Borough Surveyor, 8 St. Mary's Street, Stamford.
" 6	Woking—Road Material	Urban District Council	G. J. Wooldridge, Surveyor, Bank Chambers, Woking.
" 8	Newport, Salop—Repairing	Urban District Council	A. Massey, Surveyor to the Council, Newport.
" 10	Bromley—Materials	Rural District Council	P. J. D. Wiley, Union Offices, Bromley, Kent.
" 12	London, S.E.—Kerbing, &c.	Lewisham Borough Council	Surveyor's Department, Town Hall, Catford.
" 12	Settle, Yorks—Highway Diversion	Rural District Council	L. Bell, Highway Surveyor, Town Hall, Settle.
" 21	London, N.—Road Works	Hornsey Town Council	E. J. Lovegrove, Borough Engrn., Southwood Lane, Highgate, N.
SANITARY:			
Sept. 1	Yardley, near Birmingham—Drains, &c.	Highways & Bridge Committee	A. E. Brookes, Breedon Cross, King's Norton.
" 1	Blaydon-on-Tyne—Scavenging	Urban District Council	R. Biggins, Council Offices, Blaydon-on-Tyne.
" 2	Byker, Newcastle-on-Tyne—Sewerage Works		A. S. Dinning, 21 Ellison Place, Newcastle-on-Tyne.
" 2	Handsworth, Staffs—Sewers, &c.	Urban District Council	Surveyor, Council House, Handsworth.
" 3	Darlington—Scavenging	Rural District Council	J. Robinson, Union Offices, Darlington.
" 3	Carleton, near Poulton-le-Fylde, Lancs—Sewers	Sewerage Committee	A. Hindley, 41 Abingdon Street, Blackpool.
" 5	London, N.—Re-drainage	Tottenham Education Committee	W. H. Prescott, 712 High Road, Tottenham.
" 12	London, W.—Sewage-disposal Works	Hanwell U.D.C.	S. W. Barnes, Council Offices, West Hanwell.
" 13	London, N.—Dust Collection	Edmonton U.D.C.	R. J. Butland, Town Hall, Edmonton.
" 13	London, N.—Sewerage Work	Edmonton U.D.C.	G. E. Eachus, Town Hall, Edmonton.
" 14	Buntingford—Sewer, &c.	Rural District Council	E. J. Thody, Surveyor, Buntingford.
" 19	Newport, Mon.—Scavenging	Corporation	R. H. Haynes, Borough Engineer, Town Hall, Newport.
Oct. 24	Larne, Ireland—Sewerage Works	Rural District Council	J. W. Whiteford, Engineer, 28 Waring Street, Belfast.
TIMBER:			
Sept. 26	London, E.C.—Telegraph Poles	G.P.O.	S. C. Hooley, Stores Department, 17-19 Bedford Street, W.C.

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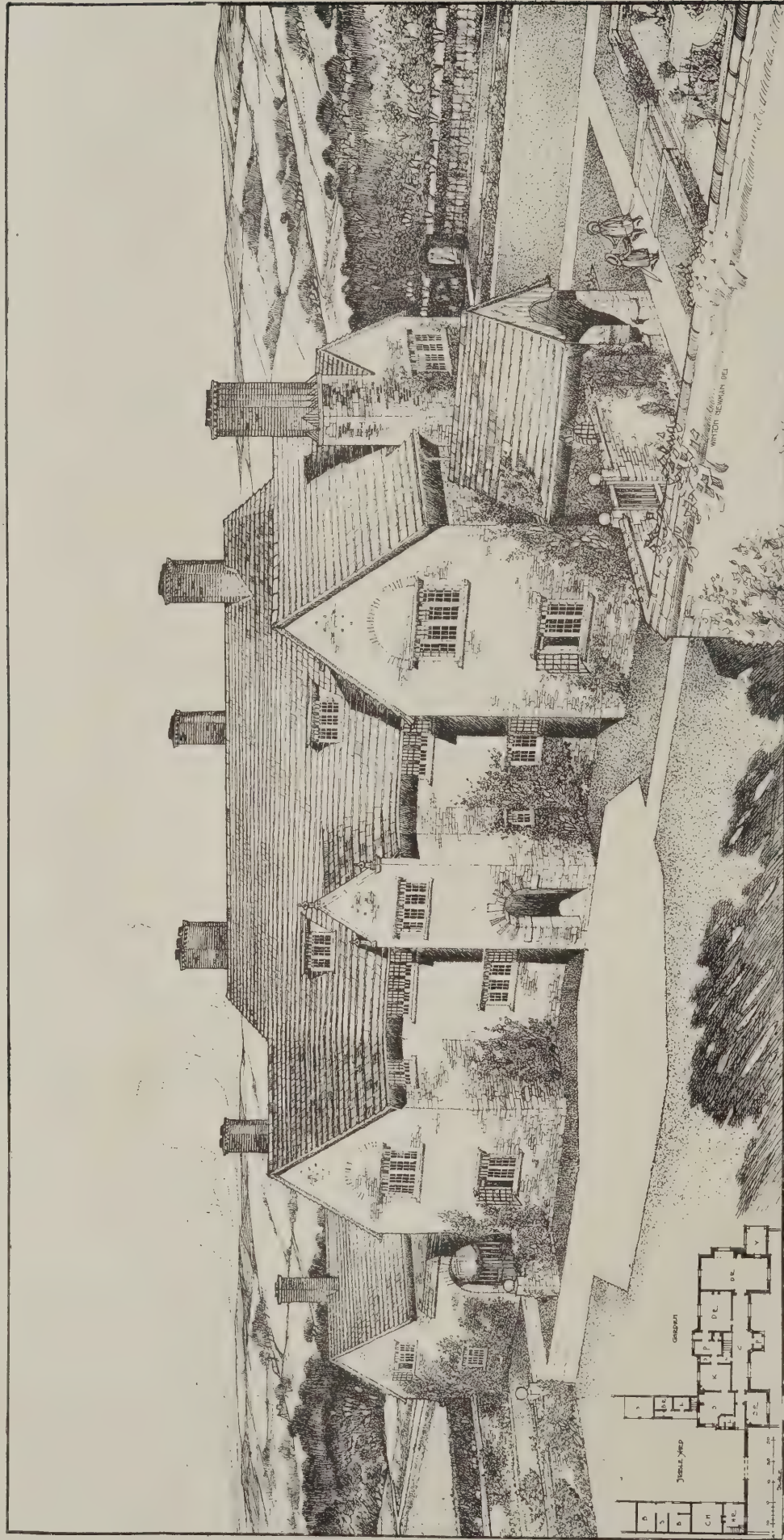
Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, September 7th, 1904.



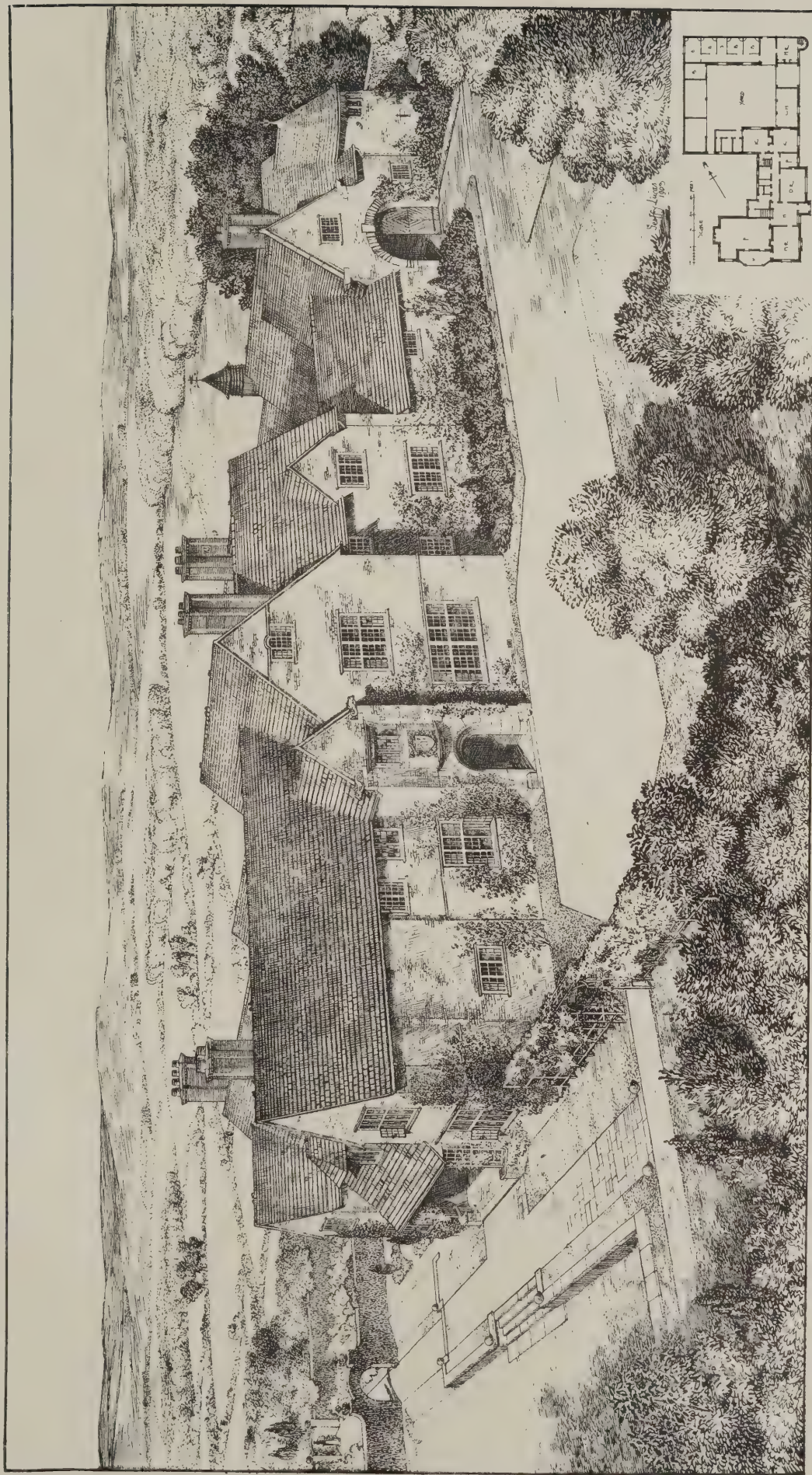


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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

September 7, 1904. Vol. 20, No. 500.

6, Great New Street, Fetter Lane, E.C.

Summary.

In the Women's Hospital, Wolverhampton, a special feature is the provision of flat roofs between the wards which not only provide means of escape in case of fire but also give cross-ventilation; on to these roofs patients may be wheeled and thus be enabled to reap the advantage of the sunshine and fresh air at an earlier period of their convalescence than would otherwise be possible. (Page 122.)

Pitch-pine was introduced into France about the year 1869, and did not gain popularity so rapidly in that country as in England. Now, however, enormous quantities of this timber are used in France, and, owing to increased demand, the price for this wood is rising proportionately. (Page 123.)

The resin in pitch-pine is prevented from oozing out by smoking the trees immediately after felling, which hardens the resin and causes it to crystallize in the woody fibres. (Page 123.)

In an important paper on the durability of paints it is stated that (1) fineness of the pigment is a more important element than its composition in the durability of a paint; (2) the arguments advanced by manufacturers that certain paints which contain large amounts of colouring matter can therefore bear thinning with a great deal more oil and so cover more surface is a fallacious one; (3) fillers of finely-ground inert matter are advantageous and not to be considered as adulterants; and (4) dry grinding is preferable to grinding in oil. (Page 126.)

The following method was adopted for strengthening the bearing material under caisson piers of the new Merrimac River Bridge:—A foot of water was allowed to rise in the cylinder, which was under pressure, cement was poured in and then an air pressure put on the cylinder of a sufficient amount to force the grout out of the bottom into the surrounding soil. (Page 126.)

An office staff for a builder employing 1,000 men is given on page 131.

A yellow roofing slate has been discovered in Arkansas. (Page 126.)

The builders' labourers at Toronto, Canada, have struck work for an increase of wages. (Page 131.)

A novel method of hoisting materials and scaffolding has been adopted by Messrs. Chessum & Sons at a block of buildings they are erecting in Dalston Lane, near Hackney Downs Station. Scarcely a ladder is to be seen, open stairways being fixed for the use of the men engaged, and by means of sheer-legs all materials are whipped aloft in barrows and rapidly wheeled across a "fenced run" between blocks of the buildings. (Page 125.)

A New Thames Bridge.

WHEN the Holborn to Strand Street is finished by the London County Council it is bound to greatly increase the traffic over the river, and the Council is now casting about for a scheme by which this extra traffic can be prevented from congesting the existing bridge of Waterloo, or Fleet Street if the alternative course is taken of going over Blackfriars Bridge, though the latter is not anticipated. It seems to be recognized that no solution of the problem lies in widening Waterloo Bridge as was done with London Bridge, for it is rightly thought that this would be only a temporary relief, while the vandalism of such a course, which would ruin our last remaining bridge on the Thames which is of good architectural design, is, we are glad to say, not altogether lost sight of. The remedy which seems to suggest itself to most is to build another bridge opposite the Law Courts end of the crescent, to divide the stream of traffic, midway between the existing bridges of Waterloo and Blackfriars, and the formation of a magnificent thoroughfare running direct from St. Clement Danes to St. George's Circus, Lambeth, where both the Waterloo and Blackfriars roads converge. Assuming that they decided to carry out the scheme, and obtained the approval of Parliament to that end, they would be obliged first to buy up all the property which runs from the Strand to the Victoria Embankment and is bounded by Essex Street on the one side and Arundel Street on the other. The existing gradients at this point would enable the northern approach of the proposed bridge to start on a level with the Strand. The bridge, which should be at least 100 ft. wide, would reach the southern side of the river at Lambeth, somewhere between Cornwall Road and Coin Street. Thence an avenue could be cut in a straight line to St. George's Circus, crossing the Commercial Road, Stamford Street, New Cut and Webber Street *en route*. Now this scheme is admirable. We may regret the interruption of the noble sweep of the Embankment, the part with the most pleasing outline of buildings backing it, undefiled by Charing Cross Station and the colossal piles of the Savoy and Cecil Hotels; but we must recollect that the Seine has bridges at much less distance apart. Our criticism is, however, as to the expense. We favour the promotion of a Bill for the compulsory purchase of Charing Cross railway bridge and the use of this for road traffic. A new approach road would, of course, have to be constructed on the Surrey side of the river, but this would

cost less than that proposed for a new bridge. Even if the superstructure had to be rebuilt it would cost less than an entirely new bridge, and the purchase of bridge and station should not be exorbitant, for as the South Eastern and Chatham Railways have stations at Cannon Street, St. Paul's and London Bridge they are well served, and the line to Charing Cross is only a loop from Cannon Street Station, and the abandonment of it has often been contemplated. If Charing Cross bridge were open for vehicular traffic it would relieve the Holborn-Strand Street because the traffic which comes down Tottenham Court and Charing Cross Roads, and at present has to go much out of its way over either Westminster or Waterloo Bridge *via* Whitehall or the Strand, would proceed direct. If either course is adopted we hope the design will be given into the hands of an architect, who should for preference be selected by competition; the Council has already created a precedent for this in the case of the Holborn-Strand Street.

A Directory of Builders.

WE introduced our Employment Register recently to meet one difficulty experienced by the architectural profession and the building trade, and the considerable use made of it by both those seeking situations and employers in need of assistance has made it a great success. We are now introducing another feature to meet another crying need. This is a directory of reliable builders and contractors. It is common knowledge that architects in large centres experience the greatest difficulty in finding reliable builders when they have a job in districts where they have not had previous dealings. There are directories of builders, but they give not the slightest clue to the standing of the firms therein enumerated in such bewildering profusion. The information an architect specially seeks is particulars of what contracts a builder has already carried out. A builder's fame does not spread far. It is a common failing not to look ahead and a contractor with jobs in hand omits to take precautions that he shall not be left without work at the conclusion of them. Members of the dramatic profession regularly keep their business cards in their professional papers to guard against loss of employment, and how much more necessary is it with a contractor's business employing many men and utilizing much capital in plant, &c. It will be seen from the inset sheet in this week's issue that we shall publish monthly a supplement containing addresses of builders, with lists of work they have done.



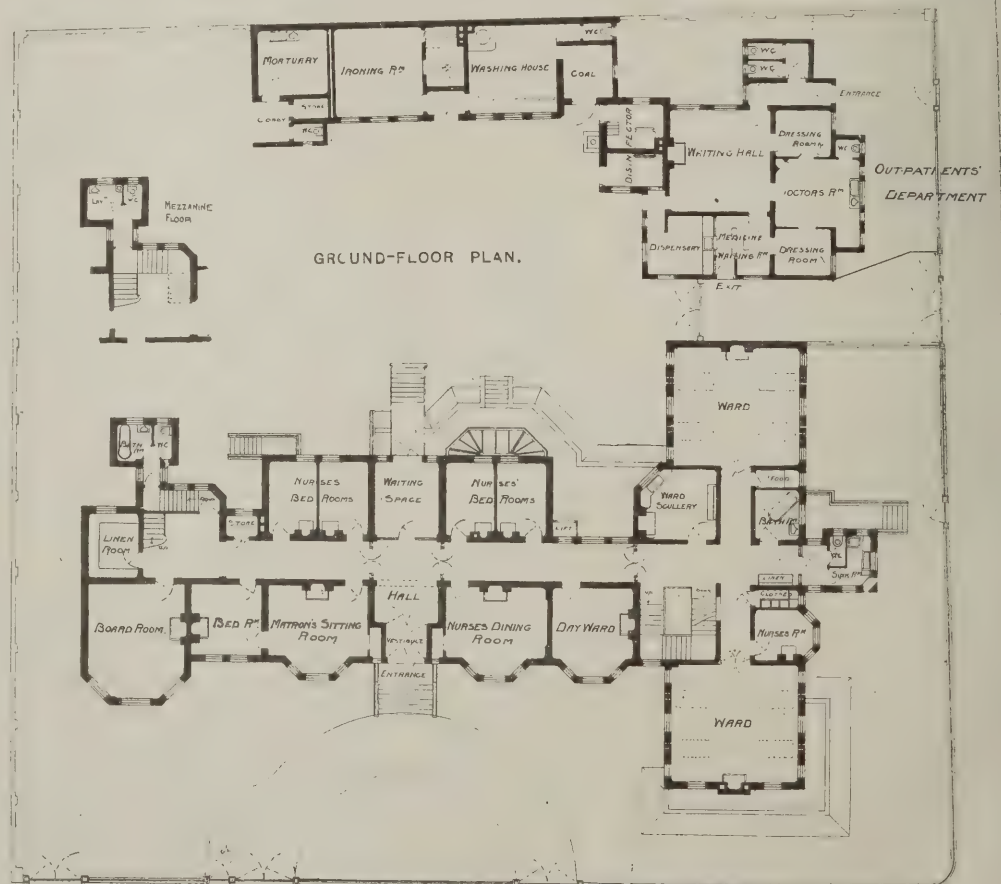
WOLVERHAMPTON HOSPITAL FOR WOMEN. A. EATON PAINTER, ARCHITECT.

WOLVERHAMPTON HOSPITAL FOR WOMEN.

THE new hospital for women which has been erected in Connaught Road and Park Road West, Wolverhampton, was designed by Mr. A. Eaton Painter, architect and surveyor, of Wolverhampton, whose plans were selected in a competition open to the members of the Wolverhampton and District Architectural Association, the assessor being Mr. Thomas W. Aldwinckle, F.R.I.B.A. The special conditions were that no windows in the building should overlook the adjoining lands on the south and east boundaries; the kitchens, &c., were to be placed in the basement: each ward was to have through ventilation, and good provision was to be made in case of fire. The building line in Connaught Road was to be set back 12ft. from the roadway and that in Park Road West 17ft. from the roadway. In planning the hospital it was deemed advisable that the main frontage should be to Park Road West, so that the building would overlook the West End Park. Unfortunately this necessitated a north-eastwardly aspect for the buildings placed along the principal boundary, but it was felt that the compensating advantages of such an arrangement justified its adoption. The buildings are in two groups: the larger or hospital group proper being placed along the north-eastern side and for the greater part set back some distance from the building line in Park Road West; the smaller group, or out-patient and laundry block, is placed along the south-western side. In general arrangement the ground floor is kept 5ft. above the level of the site and is of uniform level with the first floor. The main block may be roughly divided into three parts, namely, a centre part and two wings, the former being partly a three- and partly a four-storey building, while the wings (with a slight exception) are of two storeys. The staircases are placed at the extreme ends of the centre part, it being considered that this

arrangement would best provide means of escape in case of fire. In the north-eastern wing are placed the four-bed wards for convalescents and minor operation cases, together with the ward kitchens, bathroom for patients, stores for linen and patients' clothes, small retiring-rooms for nurses, and food cupboards, whilst in the south-eastern wing are placed the board-room (on the ground floor) and a linen-room readily accessible to the matron, with the operation theatre (both top- and north-lighted) and an anæsthetic room adjoining. The operation theatre is kept well back from the public road, as also from the drive-in and entrance to the hospital. The architect recognized the desirability of

placing the two-bed wards for important operation cases on the same floor as the operation theatre, and as it was not possible to incur the cost of a passenger-lift to take patients from one floor to another this arrangement became almost a necessity; but space for a future lift is provided. The sanitary offices are placed in two towers at the extremities of the block, so arranged as to ensure efficient cross-ventilation; they are approached by covered bridges. The day-room is on the ground floor next the patients' staircase. The entrance-hall is placed nearly centrally in the main front and immediately opposite is a waiting space for patients' friends, &c. Adjoining the hall on one side



PARK ROAD WEST.

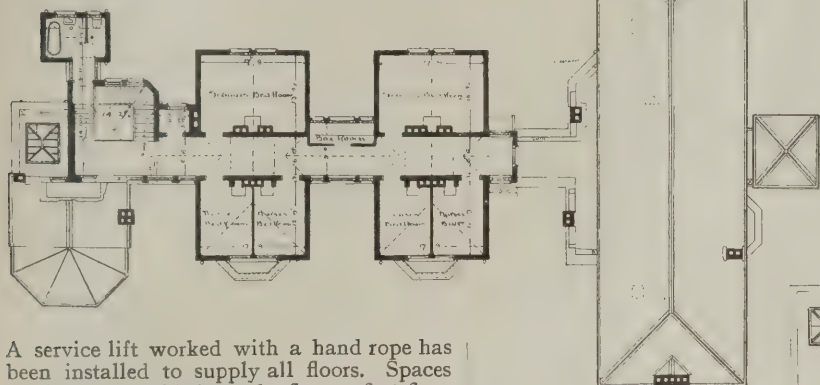
are four bedrooms for nurses and the matron's bedroom in suite with her sitting-room, while the nurses' dining-room is on the other side of the hall. The remaining four bedrooms for night nurses are on the top floor in the front, and opposite to them, to the rear, are two dormitories for servants. In the basement of the hospital are the kitchen and scullery, together with a general store, china store, larder, cellar for house coals, tradesmen's entrance, and boiler-house. A w.c. and boot-room are provided in the lower storey of one of the sanitary 'towers'

fixed behind the heating coils, and the extraction is by means of the open fireplaces and flues formed in the chimney stacks. The domestic hot-water supply is obtained from an independent boiler fixed at the side of the heating boiler. The boiler is connected to a storage cylinder fixed at ceiling level in the boiler-house, from which a quick and efficient supply of hot water is obtained at every lavatory basin and bath in the building.

bracket fixed to the wall, giving to this fitting a movement in any direction. The wards are lighted from steel-bronzed wall brackets, with a centre pendant from the ceiling for general light, which is controlled by a dimmer switch for reducing the amount of the light. Two lightning conductors have been fixed on the building, in copper tape being used, which is earthed to two copper plates each 4ft. by 4ft. buried in a suitable position. The specifications for electric lighting and other electrical equipment were prepared by Mr. Leonard Stallybrass, of Wolverhampton.

PITCH-PINE TIMBER.

PITCH-PINE, a wood almost unknown in Europe towards the middle of the last century, has to-day become of general use, enormous quantities of it having been used in this country during the past thirty years for a thousand-and-one requirements. We have it on the authority of our French contemporary "Science, Arts, Nature" that it was introduced into France about the year

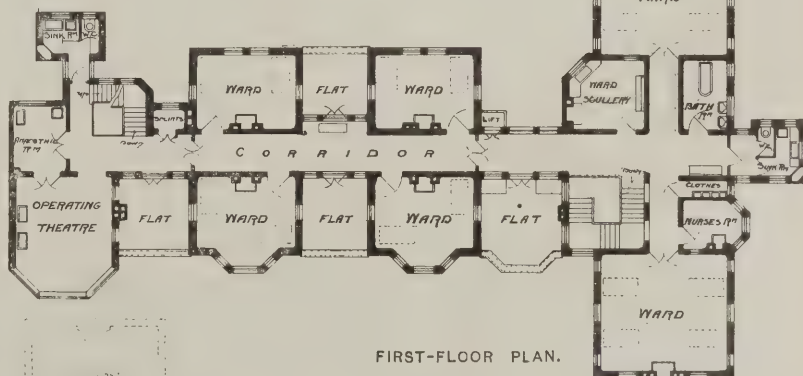


SECOND-FLOOR PLAN.

A service lift worked with a hand rope has been installed to supply all floors. Spaces for ice are provided on the flats at first-floor level and food safes in connection with the outpatients' department. There are also a waiting hall, doctors' and dressing-rooms and a dispensary. The laundry building abuts on the out-patients' department, to the south-east. A mortuary and disinfectant are provided. Warming is by open fireplaces, supplemented by hot-water pipes and radiators. "Natural" ventilation has been relied upon for all purposes, the windows opening everywhere. The possibility of future extension has been carefully kept in view. The accommodation of the hospital is twenty-four beds. A special feature of the arrangements is the provision of flat roofs between the wards which not only provide means of escape in case of fire but also give cross-ventilation; on to these roofs patients may be wheeled and thus be enabled to reap the advantage of the sunshine and fresh air at an earlier period of their convalescence than would otherwise be possible.

Mr. Henry Gough, of Wolverhampton, was the builder; the fireproof floors and concrete staircases were executed by Messrs. Dennett and Ingle; the hot-water heating and hot-water service by Messrs. Ashwell & Nesbit,

The electric lighting has been arranged on two separate installations, for which purpose a four-wire service has been introduced from the street cables, to a meter-room in the basement, from which the sub-mains to the various distributing boards are run. The wires have been protected by enamelled steel conduits sunk beneath the plaster, arranged so that any wire may be withdrawn without interfering with the fabric of the building.

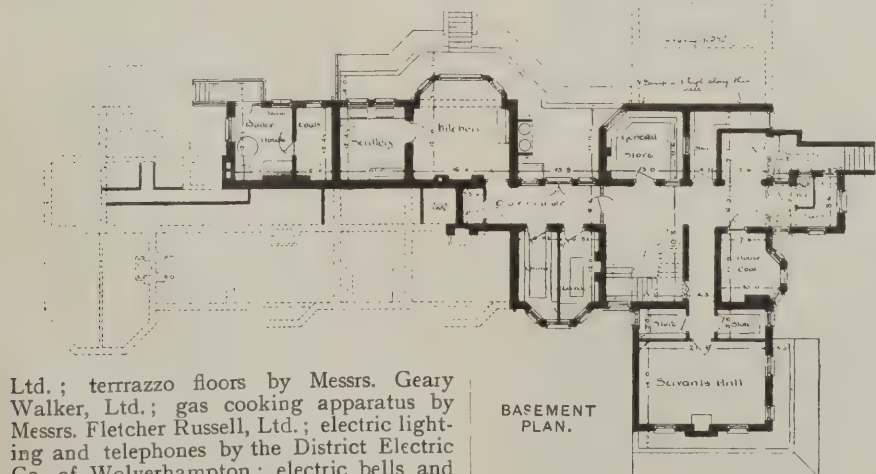


FIRST-FLOOR PLAN.

1869, though it did not gain popularity so rapidly in that country as in England. Now, however, enormous quantities of this timber are used in France, and, owing to increased demand, the price for this wood is rising proportionately.

Extremely resinous and of a reddish-yellow colour, pitch-pine possesses a hard and compact grain, with specific gravity 0.666 to 0.875, according to dryness. Once "worked," pitch-pine will not go out of shape; it is not attacked by insects, but those woods should be employed which are not gummed, i.e., saturated with their resin. This resin is prevented from oozing out by smoking the trees immediately after felling, which hardens the resin and causes it, so to speak, to crystallize in the woody fibres. The large amount of resin which pitch-pine contains—thereby preventing decomposition—renders it admirable for the making of piles, pales, &c., for it lasts even better under water than on land and its durability would appear to be equal to that of the oak.

Good quality pitch-pine should be uniformly of a beautiful bright yellow, though slightly reddish colour; the concentric rings, which should not be too broad, should be



BASEMENT PLAN.

Ltd.; terrazzo floors by Messrs. Geary Walker, Ltd.; gas cooking apparatus by Messrs. Fletcher Russell, Ltd.; electric lighting and telephones by the District Electric Co., of Wolverhampton; electric bells and speaking tubes by Messrs. R. W. Ulett & Son, of Wolverhampton; laundry machinery by Messrs. Bradford & Co. As regards the heating, an independent boiler has been fixed in the basement, from which mains are carried to supply the radiators on the floors above. Sufficient radiators are fixed in the operation theatre to bring the temperature up to 80 degs. Fahr. in cold weather. The ventilation is obtained from fresh-air inlets

A separate cable has been run to a 6-way distributing board to supply the operating theatre and anaesthetic-room lights, and another cable has been laid to supply heat and power to these rooms. The operating table is illuminated by a cluster fitting under a white enamelled copper reflector suspended upon a counterweight, and has a lateral movement upon the arm of an 8ft. swing

alternate, the one of a bright yellow colour charged with resin, the other of a softer substance of a whitish colour. The resin odour should be good and natural, and the shavings should be rolled off properly and not fly off in splinters.

The "Bulletin de la Société d'Acclimatation" reminds us that pitch-pine wood comes from two coniferæ growing, one to the north of the United States, the other to the south—the *Pinus rigida* and the *Pinus Australis*—though the name "pitch-pine" would appear to belong rather to the first, although Europe receives far less of this than of the second variety.

Otherwise the qualities of the wood of these two varieties are identical, the reddish coloration of the *Pinus Australis* not being so pronounced as is the case with the *Pinus rigida*.

The southern pine grows especially in the magnificent forests of Texas, Louisiana, Mississippi, Florida and Georgia. This is a very beautiful tree, growing to a fairly good height, its trunk (which is protected by a thick bark) rising to about 42ft. without there being a knot in the wood. It prefers a porous and siliceous soil, prospering remarkably well when the subsoil is clayey.

The rigid pine grows in the northern part of the States of Maine, Vermont and New York; and whereas this tree may grow to a height of over 90ft. in damp soil, it does not attain more than 40ft. or 50ft. in dry soil; it will also flourish in those places where it is not possible for any other variety to live—in dry soils which are not too calcareous as well as in damp earth. It may, however, be observed that it is only in relatively dry soils that its woods will attain all their fine qualities.

These two descriptions have been acclimatized in Europe, and though the southern pine is somewhat susceptible to cold the rigid pine withstands cold very well. In view, therefore, of the high value of pitch-pine wood, the acclimatization of these trees should possess great interest to all engaged in the timber trade. Our contemporary says that it is well known that since the appearance of Russian oleo-naphtha the demand for resin oils has not been so great, and, consequently, the product of the French pine plantations—though that of Landes in particular—has considerably diminished. The



PORCH TO MR. CADBURY'S HOUSE.

trees that are felled are principally used for mining purposes and in the making of railway sleepers and telegraph posts; but a metallurgical revolution that would substitute iron or steel pieces for the posts and sleepers made from the pine would ruin the exploitation of the maritime pine. The successive substitution, therefore, of American pines for the French varieties—whose timber, it may be added, is far inferior in value to that of the pitch-pine—would be a step in a wise direction, and the foresight prompting such a move would, undoubtedly, be fully rewarded by the eventual results.



HOUSE FOR MR. CADBURY, SIR HARRY'S ROAD, BIRMINGHAM: HALL.
JAMES A. SWAN, ARCHITECT.

It may, in conclusion, be asserted with M. Baltet that in certain regions such as Champagne (in France) having a barren calcareous soil, where neither the southern nor the rigid pine could exist, they could be made to prosper by grafting them on the Austrian or the black pine which grow so well in that region, and the same remark may be applied to other localities outside France.

OUR PLATES.

THE County School for Boys at Cambridge was the accepted design in a limited competition held in 1902. The school was publicly opened in October last by Lord Overbury. The object of the School is to supply a good and suitable education for boys who are likely to follow industrial and commercial pursuits, and to meet the needs of the agricultural community, which is large in the county, an agricultural science school has been established; while, in view of the fact that building is the second largest industry in the district, a building and engineering department is included in the advanced course. The third special subject is ordinary business and commercial training. The building faces due east to Hills Road, Cambridge, and the site backs on to the London and North Western and Great Eastern railway lines. The school is surrounded by experimental gardening grounds, and there is a large cricket and football field at the back. The building is planned with three floors. The main entrance admits to an octagonal hall around which are grouped the rooms for the staff and also a waiting-room for callers. On the same floor are arranged three classrooms and biological laboratory, each accommodating thirty students. Along the main corridor are arranged lockers for the students' books. Two widestone staircases lead up to the first floor, one at each end of the building; on this floor is the assembly hall (60ft. by 30ft.), which will seat 250 persons. This hall is panelled round to a height of 6ft. with pitch-pine, part of this being arranged as cupboards to serve as the school library. It is lighted from both sides and by windows high up in each gable end. A small platform is placed at one end. The hall can be divided into two classrooms, when required, by curtains. On the same floor to the north of the hall are two classrooms, which can be made into one by means of a folding partition, and the art room (this latter having a north aspect). On the south side of the hall and directly over the biological laboratory is the chemical laboratory. The workshops for wood and iron work are on the sub-ground floor under the laboratories, and are approached by the main staircases and also by a sloping way covered with a glass roof, which last was specially provided to give access to a large covered bicycle store. Cloak-rooms, lavatories and kitchens are on this floor. Red Suffolk bricks with Bath stone mullioned windows and copings and Ramsey tiles have been used. All the floors are of fire-resisting material, covered with wood in the rooms. The heating is by medium pressure hot water. A lodge for the caretaker is built at the north-east corner of the site.

Bibsworth and Coldicote, Worcestershire, are both built of local stone, covered with stone slates, and have brick chimneys carried down into the stonework. All the window frames and outside joinery are of English oak.

House for Mr. Cadbury.—An elevation and plan of this house, together with a section showing the hall, were published as a centre plate in our issue for July 22nd, 1903. The photographs now show the finished work, which altogether has cost £4,500.



VIEW SHOWING SHEER-LEGS AND BARROW HOIST, WITH FENCED RUN FROM BLOCK TO BLOCK, CONTINUED AROUND BUILDINGS.

NEW METHODS IN SCAFFOLDING AND IN HOISTING MATERIALS.

By B. WYAND.

IN common with many another calling, that of the hod-carrier would appear to be doomed to more or less speedy extinction. Already on many of London's giant buildings his services have been entirely dispensed with, and now there are indications of the spread of American methods of labour-saving devices in quarters where the older system has obtained for centuries past.

A good example of the latest system of scaffolding and hoisting is afforded at the huge blocks of dwellings now being erected in Dalston Lane, near Hackney Downs Station, by Messrs. J. Chessum & Sons, of Bow. Here one scarcely sees a ladder, open stairways being fixed for the use of the men engaged upon the building, all materials being whipped aloft by means of a sheer-legs, consisting, in the ordinary way, of two legs with a pulley at the top. The power installed for working the mortar mill and other machinery is utilized in connection with this sheer-legs, and hand labour in hoisting entirely dispensed with.

In place of a succession of hod-carriers ascending the ladders in slow progression, bricks, sand, lime and other materials are now hoisted in barrows and rapidly wheeled to the required spot. The carts, as they enter the works, deposit their loads at the foot of the barrow-hoist, and in marvelously rapid succession barrow after barrow

is loaded, raised, emptied and lowered. One of the photographic illustrations accompanying this article shows clearly the method of staircasing the scaffold, and the other gives a general view of the scaffolding between two of the blocks, with the fenced "run" from one to the other. The barrow hoist is roughly boarded in order to keep the barrows away from the ledgers and to steady them in ascending. Above this is seen the sheer-legs, and below the stack of bricks ready for barrowing up. It is scarcely necessary to add that, with the number of blocks Messrs. Chessum are erecting, there is more than one hoist to minimize the length of run.

An important feature of this system is that the men once upon the scaffold, they stay there till "blow-oh!" sounds. There is no need for them to descend to ground level, and the little knots engaged round the mortar beds in eager conversation over to-day's winners or yesterday's losers are conspicuous by their absence. The stairways serve their dual purpose of ascent to work and descent from work, between which they are used only by the foreman or the "bosses."

Obituary.

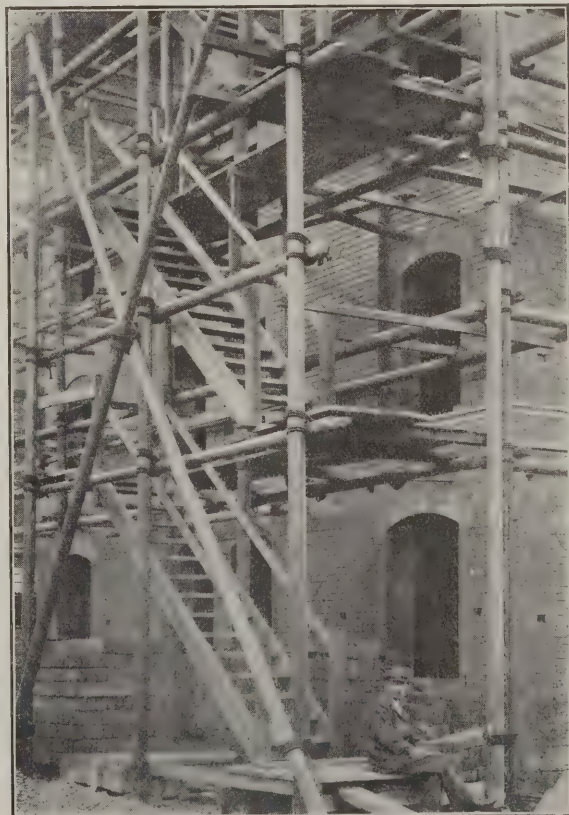
Mr. J. H. Peters, builder and contractor, of Rochdale, died last week.

Mr. John Bodley, builder, of Cheltenham, died last week. He was blind for the last thirty-five years.

Mr. F. Rendell, of Devizes, died on August 26th, aged 52 years. Deceased was head of the firm of F. Rendell & Sons, sanitary engineers and builders, of St. John Street, Devizes. He had been a member of the Corporation since 1893, and served the office of mayor in 1901-2. He was chairman of the Gas and Water Committees, also of the Sewage Works Committee.

Mr. Joseph Mastin, head of the well-known Sheffield firm of builders and contractors, of 15, Cavendish Street, died on August 27th, aged 66 years. Deceased was a native of Shropshire, and came to Sheffield about forty-five years ago, starting business on his own account ten years later. For the last twenty-two years his place of business was in Cavendish Street, Sheffield, and during that time he has erected many large buildings in the city — among them the Sheffield and Hallamshire Bank premises in the Wicker, those of Messrs. John Thompson, drapers, and Messrs. Roberts Brothers, drapers, The Moor, besides a great many private dwelling-houses. He was a staunch member and supporter of the Sheffield Master-Builders' Association, but always declined office. His son, Arthur Mastin, will carry on the business.

Discoveries at Salisbury. — Some workmen engaged in making structural alterations to some business premises in Salisbury have come across four large and beautifully carved stones, which, upon examination, were found to be exactly similar in design to certain portions of ornamental work in the cathedral. With them was excavated the basin of an Early English font. Additional interest attaches to the find in consequence of the fact that an ancient legend marks this particular site as that of the pay-house for the men who were engaged in building the cathedral.



VIEW SHOWING OPEN STAIRWAYS FOR MEN, IN PLACE OF LADDERS.

Construction Notes.

Cylinder Foundations.

IN preparing the foundations of the new Merrimac River Bridge, at Newburyport, U.S.A., a novel method was adopted which is worthy of note by engineers and contractors. It often happens in sinking cylinder piers that when their lower edges reach the depth where they are intended to remain, the bearing material is found not to be satisfactory. It is not always advisable to carry them deeper and it then becomes necessary to strengthen the material in which they are seated. This was accomplished in the case of the Merrimac River Bridge by allowing a foot of water to rise in the cylinder, which was under pressure, pouring in cement and then putting an air pressure on the cylinder of a sufficient amount to force the grout out of the bottom into the surrounding soil. This process was tried at each pier in a cluster of six, and by the time the last was undertaken the effect of the grouting was plainly marked.

Algerian Onyx.

THE British vice-consul at Philippeville in his last report gives some particulars of the onyx quarry at Ain Smava. This industry suffers principally, he says, from the cost of labour and the difficulty in finding skilled marble workers; the crushing competition with marbles imported from Europe renders it difficult to develop the quarries as one would wish. The onyx marbles from Ain Smava, which are in the hands of a house at Marseilles, are sent to France to be dressed and come back if required. It is easy to understand that, under these conditions, builders prefer buying marbles ready dressed from Europe, yet as regards quality and beauty nothing can be finer than some of the onyx. The quarries at Ain Smava cover 7,500 acres, and the beds are very thick, varying in width from 6ft. to 55ft. The following are the principal qualities found there:—

Onyx—	Width.
	Ft. in.
Golden, with a seam - - - -	33 0
Cloudy - - - - -	13 0
African breccia - - - - -	13 0
Red African - - - - -	10 0
Red agate - - - - -	10 0
Denticulated - - - - -	1 8
Jasper agate - - - - -	7 0
Ondulated red - - - - -	5 0
Rose agate - - - - -	3 0

The first two seams can produce columns from 12ft. to 15ft. in length, which is very rare in onyx marbles. Eight of these monolithic columns have been prepared at Marseilles for the Roman Catholic Cathedral at Westminster, where they are now, no doubt, in position, and others are in preparation. If they are anything like the onyx employed at the town hall of Constantine, they are worth the trouble of going to see. An order from America for columns of 33ft. to 39ft. in length was received, but the great difficulty is to get blocks of this size down to the sea. The very heavy railway rates are also against profitable operations, the rate from Constantine to Philippeville, 87 kiloms., being 9 fr. per ton for marble in the rough, as against 2 fr. 50 c. charged in France for the same distance. Dressed marbles pay 17 fr. for the same distance, whereas for 35 fr. marbles can be sent from Marseilles to Paris (over 800 kiloms.). The district of Bône (Algeria) is renowned, says the British consul at that place, for alabaster of the same density as the alabaster of Valterra (Tuscany). The stone, of great transparency, takes a fine polish and can compete with the finest alabaster of Italy and Scotland. An important marble and onyx quarry, situated at Ouled-Rahmoun, is being worked by a French company. The colours are golden onyx, notched onyx, clouded onyx, red onyx, African red, pink agate and other varieties

—black, yellow, &c. Most of these marbles are similar to those of the ancient monuments of Rome and Carthage.

Calcining Temperature of Cement.

H. P. BONDE, of Copenhagen, in "Baumaterialienkunde," calls attention to how little is said about the calcining temperature of cement even in books which give full attention to everything else. Bonde, using an electric sample kiln belonging to the Government testing laboratory at Copenhagen, made a series of tests, using sample pieces made of raw cement meal with a little water. The pieces had about the shape of Seger cones, but were only half that size. The results obtained showed that the calcining temperature for normal Portland cement (75 to 76 per cent. CaCO₃) and of slag cement is close to 1,400 degs. Cent. A reduction of 3 per cent. in carbonate of lime reduced the calcining temperature 50 degs. A change in the fineness of the ground raw materials gave no indication of requiring a different temperature. Trial of a rather abnormal mixture (only a trace of Fe₂O₃ and only 70 per cent. CaCO₃) indicated that by comparison alumina seems a stronger flux than iron oxide. The author concludes that it is only through the contact with the acid fine clay that the strongly basic cement mixture can be fused at the temperatures which can be supposed to occur in a cement kiln in actual practice.

Stability of House Fronts.

IN view of several recent accidents in which fronts of houses have fallen out, with the complete destruction of all the lower part, involving loss of life on some occasions, and always dangerous to passers-by and the general public, the following suggestions of a retired builder of considerable experience are interesting. For the most part all houses built with a cornice in front have what is called a valley roof, with a gutter in the centre to take rainwater to the back. The cornice goes across the front at the height of the roof, cornice and parapet often as much as 12ft. without any tie whatever, and quite unprotected. Here is the danger. The constant tremble of houses from continued heavy traffic loosens the hold of mortar just at the gutter level, and in time the cornice pulls the whole down. Now this could be prevented for a very small cost. Let an iron bar, about 12ft. long, be ordered for every house of this construction, with screw and plate to come through the front wall just above the cornice, and the other end flattened and screwed to gutter plate. The cost will be small, but it will effectually prevent any further accident of this nature, which now seems a menace to the public.

A Yellow Roofing Slate.

MR. William H. Von Hartman, a geologist and prospecting mineralogist, who has been tracing the slate field of Arkansas for several years, and is now compiling a review of the entire field for Government information, has discovered a mountain of yellow slate which is very fine for roofing purposes, the only deposit of the kind in the world so far reported. This expert says he sometimes wonders if slate men know that there are but two known slate deposits in the world which are fit for use as roofing slates, i.e., Washington County, N.Y. (the ledge extending across into Vermont and Arkansas), and Wales. Arkansas contains 90 per cent. of all the red slate he has discovered in the former deposits, and this State, he says, also has seven different coloured slates of workable quality.

A Public Library at Kinross is to be erected from plans by Mr. Peter L. Henderson, of George Street, Edinburgh. The building is estimated to cost about £1,600.

DURABILITY OF PAINTS.

Results of an investigation for the Protection of Structural Work.

By ROBERT JOB.

(Chemist to the Philadelphia and Reading Railway Co.)

WE print below a paper read before the Chemical Section of the Franklin Institute, which is one of the most important contributions of recent years to our knowledge of paints and their durability. Briefly stated, Mr. Job's conclusions are that (1) fineness of the pigment is a more important element than its composition in the durability of a paint; (2) the arguments advanced by manufacturers that certain paints which contain large amounts of colouring matter can therefore bear thinning with a great deal more oil and so cover more surface is a fallacious one; (3) fillers of finely-ground inert matter are advantageous and not to be considered as adulterants; and (4) dry grinding is preferable to grinding in oil. We propose to write on the subject of paints again later, about which there is much ignorance and want of scientific study. We shall be pleased to receive correspondence from paint manufacturers and users, and will endeavour to enlighten them on doubtful points. The paper is as follows:—

A former standard practice for a period of about ten years upon the Philadelphia and Reading Railway for painting bridges consisted in the use of three paints, officially known as No. 8, No. 10 and No. 12 respectively. No. 8 was a red body colour, No. 10 a brown, and No. 12 a green trimming colour. The composition of the three was essentially the same, and consisted of about 22 per cent. sesquioxide of iron, with the remainder partly argillaceous gangue and partly hydrated sulphate of lime, each being ground in pure raw linseed oil and diluted for use with raw linseed oil and our standard japan.

Life of Three Paints.

Notwithstanding the similarity of composition, very marked differences were noted in the relative durability in service. No. 8, under ordinary conditions, gave fair protection to steel for about three years, while No. 12, side by side with No. 8 upon the same structure and under identically the same conditions, had at least double the life of the latter. The life of No. 10 paint was intermediate between the others. The steel coated with No. 8 paint was very generally pitted and in bad condition, while that painted with No. 12 was well protected and practically free from rust, with clean metal beneath the paint. No. 10 paint averaged better than No. 8, but was considerably inferior to No. 12.

Having found that the above general results attended the use of these paints over our lines, we began an investigation to determine the causes of the variations and to work out specifications which would ensure durability at least equal to that of No. 12 paint.

Analysis.

Upon analysis we found the following percentage composition:—

	No. 8.	No. 10.	No. 12.
Silica - - - - -	9'35	17'07	34'10
Alumina - - - - -	4'44	5'66	19'56
Sesquioxide of iron - - - -	21'07	22'74	23'24
Sulphate of lime, hydrated - - - - -	64'70	52'11	10'66
Alkalis - - - - -	44	2'93	49
Water combined with iron and clay - - - - -	(by diff.)		9'75
Prussian blue - - - - -	—	—	2'10
Carbon black - - - - -	—	—	32
Free sulphuric acid - - - -	None	None	None
Calcium carbonate - - - - -	None	None	None
	100'00	100'00	100'22
Total water combined - - -	—	—	11'88

In a general way each pigment may be said to be composed of about 22 per cent.

sesquioxide of iron and 78 per cent. inert filler, and the composition shown gives little indication of the cause of the variation in relative durability since practically the same proportion of sesquioxide of iron is present in each and the fillers used are inert.

Physical Condition.

We next turned to the physical condition of the pigment, and upon microscopic examination found marked differences.

In No. 8 the largest particles had a diameter of .0180 inch, there were relatively many of diameter of .0100 inch, and the diameter of the finest was about .0002 inch.

In No. 10 the largest particles were about the same size as in No. 8, but there were many fine particles of a diameter of about .0002 inch, and the average was considerably smaller than that of No. 8 but greater than that of No. 12.

In No. 12 pigment the largest diameter was about .0010 inch, with very few of that size, and that of the smallest particles was about .0002 inch, and the whole layer was uniform and exceedingly fine.

As nearly as we could estimate it, the average diameter of No. 8 pigment was about .0080 inch, while that of No. 12 was about .0004 inch, considering each particle roughly as a sphere. Volumes of spheres are to one another as the cubes of their diameters, and it follows that the average volume of a particle of No. 8 pigment was about 8,000 times greater than that of the average No. 12 particle.

Effect of Size of Particles on Durability.

The next point to be determined was the effect which the above differences in relative size would have upon the coating in service, and in order to render any differences readily visible we diluted the paste of each paint with definite proportions of raw linseed oil and standard japan, using our regular batch formula for service work. We then painted vertical glass surfaces with each, and let them dry at the ordinary temperature. We then viewed each under the microscope, throwing the light through the glass in such a manner as to permit distinguishing each individual particle of the pigment, and again found marked characteristic differences.

In No. 8 paint relatively large oil spaces were present around the particles of pigment.

In No. 10 there was but little such clear space, and in the No. 12 paint the particles were practically touching one another and were generally piled in several layers deep, thus breaking up the continuity of the oil-film effectively.

Considering the difference previously found in the relative size of the three pigments, it appeared evident that the presence of the clear oil-space in the case of No. 8 paint was due to the fact that the particles of pigment in that paint were so large that they could not be supported by the oil-film, and therefore gradually dragged down and separated.

Weathering of Paints.

In the weathering of linseed-oil paints the oil is gradually acted upon and the rapidity and extent of such action increases with decreased proportion of pigment in the mixture, as proven by the well-known experiments of Dudley & Pease,* the reason

evidently being that as the relative size of oil-films between individual particles of pigment diminishes the chance for the penetration of water and other rust promoters through the oil to the metal is correspondingly decreased.

From the standpoint of efficiency, it is evidently immaterial whether relatively large oil-spaces around particles of pigment are due to the small proportion of pigment as compared with that of oil, or whether they are due to the relatively large size of the particles. The result is the same in either case, and a fairly solid and unbroken surface of pigment is not obtainable, as shown above, when the paint is spread in service, and as a consequence the elements necessary to cause rusting find comparatively easy access to the metal beneath such coating.

Fineness of Pigment.

Fineness of subdivision of pigment is of well-recognized importance, and in the many valuable discussions in recent years such condition has been frequently stated to be essential to the best results,* and such expressions coincide with practical experience everywhere. Consequently, the striking variations found in the physical condition of the above pigments gave ample reason for the relative differences in service value.

Up to this point our investigation had shown the nature of the differences in the three pigments. The next step was to find some means by which these differences could readily be seen in practice, and shipments held to the standard of No. 12 paint.

A new Test.

The ordinary fineness test as formerly made, diluting 5 parts by weight of the paste with 4 parts by weight of raw linseed oil, mixing thoroughly, and placing a few drops of the paint upon a clean dry glass, standing vertical at a temperature of 70 degs. Fahr. for twenty minutes, and specifying that no separation of pigment from oil should result, was found inadequate, for all three paints easily passed such test. We therefore began to increase the severity of the conditions in order to reach the point when the No. 12 paint would just pass the test. After experiment we fixed upon a temperature of 100 degs. Fahr., instead of 70 degs. Fahr., as better adapted to our object, and diluted the paste, which contained approximately 26 per cent. of oil, in proportions of 4 parts by weight of paste to 10 parts by weight of pure raw linseed oil. When diluted in this manner and thoroughly mixed a few drops of the paint were placed upon a clean dry glass and stood vertical at a temperature of 100 degs. Fahr. for one hour. Under this test No. 12 paint showed no signs of separation of pigment from oil, and but slight fading of colour on comparing the coating at top and bottom respectively of the glass after the test. Under these same conditions No. 8 paint separated badly, and the colour at top faded out almost completely; in other words, the greater part of the pigment dragged down, leaving little more than clear oil above. No. 10 paint was intermediate between the others and showed some separation and fading, though in much less degree than in the case of No. 8 paint.

Microscopic Appearance.

Having now found the conditions under which these pigments if finely ground would not separate from the oil to an extent noticeable to the unaided eye, we determined the relative fineness of the three pigments by taking photo-micrographs of paint on the glass slip at 100 diameters, at a point in each case $\frac{1}{2}$ in. from the top of the film. With No. 8 paint the coarseness of the pigment and the separation of pigment from oil were clearly evident. With No. 10 paint we found a considerable proportion of coarse

particles surrounded by a large number of very fine particles, and comparatively small clear oil spaces between the particles. In No. 12 paint we found very few coarse particles, and an almost unbroken front of very minute particles which almost shut out the bright light immediately behind the microscope. Also no clear oil spaces were visible in this paint even at this magnification of 100 diameters, and at this dilution, and the film was found to consist of particles in several superimposed layers, so that practically the entire surface was covered with wet material and but the barest possible chance offered for the penetration of water and other elements of rust, thus giving a positive answer to the question as to the cause of the relative durability of this paint in service.

Values of Various Pigments.

Our next step was to build up a pigment having the same properties as No. 12 paint, and this naturally led to a study of the components of the three paints in question. We found that No. 8 paint was composed essentially of calcined metallic brown with hydrated sulphate of lime, in proportions approximately 35 per cent. iron pigment, and 65 per cent. hydrated sulphate of lime.

No. 10 paint consisted of approximately 52 per cent. of hydrated sulphate of lime and 48 per cent. of a natural red sienna, unburnt.

No. 12 paint was composed of natural unburnt ochre, together with about 10 per cent. hydrated sulphate of lime and 2.4 per cent. tinting material.

Thus, taking the paints in the order of their service values, we note that the greatest durability was found in natural unburned ochre rather low in proportion of sesquioxide of iron (23 per cent.), and with large proportion of clay, and relatively small addition of hydrated sulphate of lime. It is also interesting to note that in this No. 12 pigment 11.9 per cent. by weight consisted of water, though it was in combination with the clay and sulphate of lime, and not in free condition. The above results thus afford clear proof—in view of the service records—that water when in proper chemical combination with pigment does not cause rusting beneath the coating, and also that calcining of pigment is not at all necessary to good service. Upon the other hand, the least durability was found in pigment composed of well-calcined material with relatively large proportion of hydrated sulphate of lime; but the lack of durability in this case, as has been shown, was due to the physical condition of the pigment and not to its chemical composition. Hydrated sulphate of lime has been for a long time regarded as an excellent inert paint-filler, and our experience has shown that it can be brought to the degree of fineness necessary to enable it to pass the test detailed above, and when in such condition it has given excellent service. We are free to state, however, that the desired degree of fineness can be gained with very much less milling, and hence at lower cost, by use of other materials shown by our service results to be equally inert and durable; but we are perfectly willing to leave the composition of the inert if it has the degree of the fineness found necessary and specified.

Values of Various Fillers.

In order to find out the relative fineness in their commercial form of the various fillers commonly used in paint, we obtained a number of samples, mixed each with the total proportion of raw linseed oil present in the fineness test detailed above, subjected it to the test, and took a photo-micrograph at 100 diameters, $\frac{1}{2}$ in. from the top of the glass, as in the other cases. The finest hydrated sulphate of lime (gypsum) obtainable showed particles relatively coarse and granular and were surrounded with large oil

* "Railroad and Engineering Journal," 1890, p. 417. These experiments consisted in covering for 12 to 14 hours portions of surfaces consisting of two coats (allowed to dry and harden for two or three weeks) of paints made of linseed oil with a small amount of japan (i.e., driers) and the following varying amounts of the same pigment:—(1) oil and japan alone; (2) same liquid 90 parts, pigment 10 parts by weight; (3) liquid 80 parts, pigment 20 parts; (4) liquid 70, pigment 30; (5) liquid 60, pigment 40; (6) liquid 50, pigment 50; and (7) liquid 40, pigment 60. The results were as follows:—No. 1 coating cleaved off glass and shrivelled wherever the water had touched it; No. 2 same phenomenon in less degree; No. 3 same, still less in degree; No. 4 did not cleave off, but showed where water had stood; No. 5 same spot in same way, but less in degree; No. 6 still less; and No. 7 very slight, if any, action.—ED. BUILDERS' JOURNAL.

* "Iron Corrosion," Louis E. Andés, p. 127, and others.

spaces. Barium sulphate was finer to a very marked extent, and the oil spaces, though distinct, were comparatively small. Carbonate of lime (whiting) was one of the finest of the fillers examined, but where exposed to acid fumes is inadmissible. In clay the majority of particles were exceedingly fine, though considerable separation resulted. Siliceous contains a relatively large proportion of coarse angular particles, and also separated considerably. Calcined red oxide had the same general appearance as No. 8 paint. Yellow ochre was similar in fineness to No. 12 paint, and was the most finely divided of any of the materials examined.

Our new No. 4, structural paint consists of natural soft uncalcined pigment, tinted with a small proportion of carbon black, and ground in raw linseed oil in paste to pass our standard fineness test. In composition it is essentially the same as No. 12 paint, and the fineness shown by photo-micrography is even greater than that of the latter.

Solubility of Gypsum.

In reply to the discussion which followed the reading of the paper, and particularly to suggestions that the reason of the inferiority in durability of No. 8 to No. 12 paint was due to the large proportion of gypsum present and the solubility of this in water, and that fillers were simply used by manufacturers as adulterants to increase their profits, Mr. Job said:—As to the solubility of gypsum, Watts states that it is very slightly soluble in water, different authorities varying from 1 part gypsum in 400 parts water to 500 parts water. Hurst gives the solubility as about 1 part in 500 parts of water, and states that upon exposure to light and air, gypsum is unaffected, being one of the most permanent pigments known ("Painters' Colours, Oils and Varnishes," p. 80, second edition). It is

undoubtedly true, we think, that this slight solubility shortens somewhat the effective protection where gypsum is present in large proportion to the pigment, but where the proportion is moderate the influence would probably be very slight, since each particle if properly ground would be protected by the other inert matter, and thus the ordinary slight solubility would be very much lessened. It is of course perfectly possible that the poor service of No. 8 paint may have been due to a slight extent to the solubility of the sulphate of lime, but in the case of No. 10

paint we have nearly as large a proportion as in No. 8, but far better service. Moreover, in our service we have had under long exposure paints which contained fair proportions of sulphate of lime, and the durability of the coating has been good in cases where the fineness was of the degree stated in the paper.

Carbonate of Lime an Objectionable Filler.

As to carbonate of lime, our results have shown that it is inadmissible where exposed to acid fumes. In our black car paint, used upon coal cars, we have, however, specified from 10 to 15 per cent. of whiting in order to increase the fineness of the sulphate of lime base, and the results have been fairly good, but we shall probably revise this practice and gain increased fineness by use of other materials and thereby increase the durability without increasing the cost of the paint.

Fading.

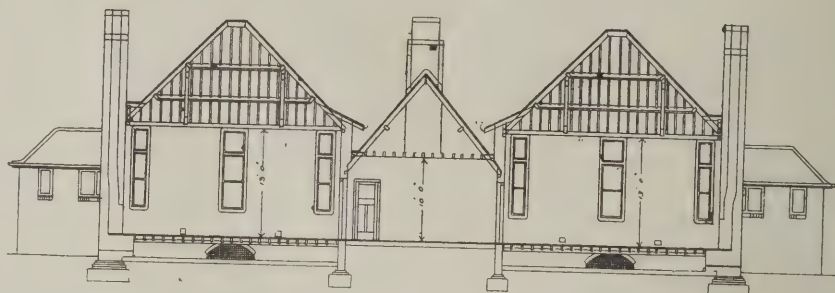
The degree of fading of the three paints was slight and about the same. There was a slight lightening of the shade in each case on long exposure. In order to get the effect of exposure and warmth upon the pigment itself without oil, we spread out a layer of each pigment in a large watch glass, and kept upon the steam table at a temperature of 150 Fahr. for about two weeks; we then mixed with oil and made comparison under glass, with the original pigment also rubbed in oil. In each case we found a slight lightening of the shade, about the same as found in service.

The Place of Fillers.

As regards the question of inert matter we can do no better than quote the important papers of Dudley and Pease, to which reference has already been made: "All we can say is that we try to use as much pigment which from its nature is chemically inert and as little pigment which is chemically active as possible. To our mind, the well-known fact that white lead mixed with barytes or other inert material lasts longer than pure white lead is explained on the supposition that the white lead combines chemically with the oil, forming a chemical body which is not as durable as dried linseed oil with an inert pigment."* And again: "A mixture of two pigments of good and inferior covering power can be made which will give almost, if not quite, as good covering power as if the paints



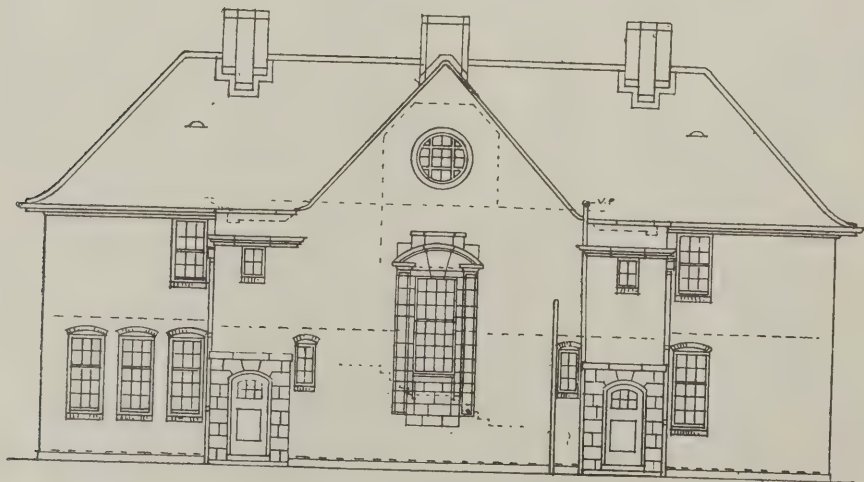
WEST ELEVATION.



SECTION ON LINE C.D.
INFECTIOUS DISEASES HOSPITAL, AMPHILL: EIGHT-BED BLOCK.



SOUTH ELEVATION.



NORTH ELEVATION.

INFECTIOUS DISEASES HOSPITAL, AMPHILL: ADMINISTRATIVE BLOCK.

* "Railroad and Engineering Journal," September, 1890, p. 416.

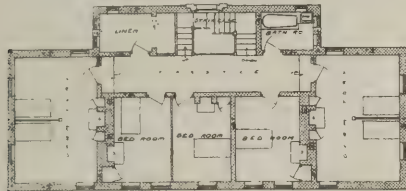
† Idem. February, 1891, p. 82.

were made wholly of the better pigment." "The law as we understand it is this: 'You may use as much inert material as will leave good optical covering power when the paint is properly mixed and applied.'"

The above is clear and to the point, and is in thorough accord with the teachings of our service results in cases where the pigment was of the degree of fineness stated in this paper, and it will be noted that our No. 12 paint, which gave excellent service, was composed of 75 per cent. of inert matter and only 25 per cent. of material even slightly chemically active. As has been shown above, the difference between success and failure in the service of such paint ground in linseed oil and properly applied lies in the mechanical condition of the pigment—a matter which can be easily regulated.

As to the composition of No. 8, No. 10 and No. 12 paints, the latter is the most favourable of the three, due to the presence of the larger proportion of clay, the cause being, we think, not any especial virtue in the clay itself, but the fact that clay of good quality consists of matter chemically inert, practically insoluble and in an almost impalpable state of fineness, and consequently it is in a condition from which efficiency would be expected even without milling.

"Railroad and Engineering Journal," April, 1891, p. 176.



FIRST FLOOR PLAN -
ADMINISTRATION BLOCK -

Oxide of Iron Pigments which we use.

We have examined samples of pure red oxide pigments such as used abroad upon structural work, and found that one sample, containing 97.50 per cent. sesquioxide of iron, fully met our requirements for fineness, and was of very good quality throughout. Such a pigment, if properly prepared, would without question give good results. Our main criticism would be that it would cost more and would probably give less efficient service than if diluted with sufficiently fine inert matter of good quality. Cost of paint is an important matter of consideration to the large consumer, and one fact clearly emphasized by this study is that durability and low cost can be made coincident.

Grinding Dry.

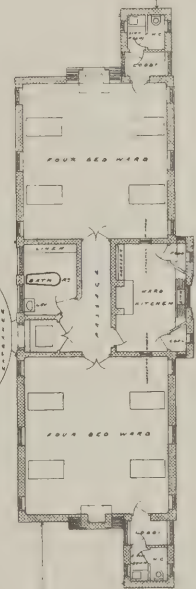
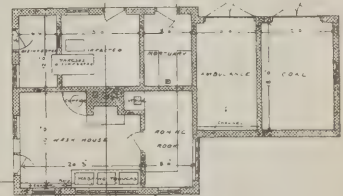
Our experience is that pigments can be made fine in the dry condition much cheaper than they can after they have been mixed with oil, and, as referred to in the paper, we have found that the desired degree of fineness can be obtained with very much less grinding, and hence at lower mill cost, by use of inert materials which occur in a natural state of extreme fineness and hence require little more than thorough mixing with oil of good quality to make into serviceable protective paint, and such materials can be obtained upon the open market at relatively low cost. We have also found that pigment of less initial fineness can be brought to the desired condition more economically by grinding without addition of oil, the reason being, we take it, that when oil is present its viscosity prevents the milling surfaces from coming into close contact, and hence shuts out the chance for the degree of fineness of pigment otherwise obtainable.

Fineness of pigment certainly has a decided influence upon time of drying, as, for instance, in pure lampblack paint (to cite an extreme case); but with the ordinary inorganic pig-

ment, the degree of fineness is so far below the latter standard that not the slightest difficulty due to slow drying is found when the pigment is even finer than in the No. 12 paint referred to above. In use of that paint a dry coating could be obtained in eight hours when necessary, but we think it better practice to use the minimum proportion of japan and allow a longer time for drying.

AMPTHILL INFECTIOUS DISEASES HOSPITAL.

THE little infectious diseases hospital now being erected at Ampthill, in Bedfordshire, from the designs of Mr. H. Percy Adams, F.R.I.B.A., is especially interesting for its arrangement. From the accompanying plan it will be seen that the buildings are arranged around an open square of ground, the administration block being on one side and the ward blocks on the other three; a laundry block and mortuary adjoining. The buildings are of brick with Bath stone dressings and tiled roofs, teak floors, walls lined with glazed brick dadoes, painted with enamel paint above, except the bathrooms, which are tiled. Ventilation is provided by fresh-air inlets at floor-level and extractors at the ceiling. The cost of the hospital will be £10,000.



INFECTIOUS DISEASES
HOSPITAL, AMPTHILL.

H. PERCY ADAMS,
F.R.I.B.A. ARCHITECT

Keystones.

A Stained-Glass Window has been placed on the north side of Totteridge Parish Church, in memory of the late Sir Charles Nicholson. It was designed and carried out by Mr. Archibald K. Nicholson.

Aberystwyth Library Competition.—The first premium of £30 has been awarded to Mr. Walter G. Payton, of Colmore Row, Birmingham. There were forty-eight competitors. Mr. Carnegie has promised to give £5,000 towards the cost of the building.

The Measured Drawing of Ironwork in the Lady Chapel, Gloucester Cathedral, reproduced on p. 114 of our last week's issue, was made by Mr. T. Overbury, of Messrs. Healing & Overbury, architects, of Lloyds Bank Chambers, Cheltenham.

A Court House at Woking is being erected at a cost of £2,000 by Mr. Robert Wood, of North Street, Guildford, from designs by Mr. F. G. Howell, the county surveyor, under the supervision of Mr. W. Edwards. The heating is being carried out by Messrs. G. N. Haden & Sons, of Cromer Street, London, W.C.

A Block of Shops with residential flats over is to be erected on the site of Nos. 258 to 266, Vauxhall Bridge Road (Victoria Street end), London, S.W. The building is to have a roof garden approached by electric lift. The elevation will be carried out in red brick, with brick carving and terra-cotta dressings. Messrs. Palgrave & Co., Westminster, are the architects.

The new Town Hall for Stockport, the erection of which will be commenced shortly, is estimated to cost £66,000. Mr. William Pownall, builder, of Stockport, whose estimate amounted to £54,496, declined to enter into the contract on the conditions imposed, and the next tender of Mr. Josiah Briggs, of Heaton Norris, for £56,881 has been accepted. Mr. Brumwell Thomas is the architect.

The new Patent Law.—By an order of the Board of Trade just published, Section I. of the Patents Act, 1902, is to be brought into operation on January 1st next, so that on and after that date all applications for English patents upon which a "complete" specification has been filed will be examined to ascertain whether the invention the subject-matter of the application has been wholly or in part claimed or described in the specification of any prior English patent granted for fifty years next before the date of the application.

County Hall for Suffolk.—The East Suffolk County Council, having no public hall at Ipswich in which to hold their meetings, and not having sufficient money to build one in stone, the Rev. F. French, of Worlingworth, suggests that a hall be built of Suffolk oak "in the Old English style." The oak, he says, might be furnished by each landowner or hundred: he himself offers to send a load from his estate, and Mr. J. B. Chevallier, of Aspell Hall, Dereham, has promised to deliver at Ipswich an oak containing at least 40 cub. ft. of timber.

An Electric Bakery and Confectionery has just been erected at 91 and 93, Falkner Street, Liverpool, from designs by Mr. Edmund Winter, architect, of Liscard. The building is fitted up with all the latest improvements in the shape of two-decker patent steam-pipe ovens, with patent telescope draw-plates and a patent electric motor-driven dough-kneader. The contractors were Messrs. Bullen, Brothers & Son, of Almond Street, Liverpool, the working plant and machinery being supplied by Messrs. Werner, Pfleiderer & Perkins, of Regent Square, London.

A new Wesleyan Church at Rochdale is being erected near Greenbank Road, Cronkeyshaw, from designs by Mr. T. Butterworth, M.S.A., of Dearnley, at a cost of about £2,000. Mr. G. F. Endersby, of Rochdale, is the builder.

The Victoria Memorial.—The foundations of the new wall bounding the forecourt of Buckingham Palace—a part of the Victoria Memorial scheme—have now been laid, and a few sections of the railings have been erected and leaded into position. All the old stonework of the piers which is available is being used for the new fence, but to remove the iron supports it was necessary in some cases practically to destroy sections of the stonework, and to replace these new blocks are being cut and shaped on the premises. The finished work will stand about 12ft. further out than the old place, but the additional space thus given to the forecourt is balanced by the cutting-off of the end sections.

A Hospital for Consumptives at Kettering has been erected for the Board of Guardians by Messrs. C. & F. Henson, at a cost of £4,700, from designs by Messrs. Gotch & Saunders. The buildings are divided into four parts—the phthisis block, the chronic block, the extension of the ordinary infirmary attached to the workhouse, and an enlargement of the nurses' home. In the phthisis block the main idea was to have a thorough access of fresh air to every part. It may be described as a large covered verandah, with large screens open to the part devoted to the beds. Beyond these is a long range of windows, every portion of which is made to open. There are two wards, each to contain ten beds, and between them a common room for dining and a small kitchen and nurses' room, from which complete supervision can be obtained through special panes of glass. The patients will be fed from the central kitchen in the workhouse proper.

"A History of English Furniture," written by Mr. Percy Macquoid, is to be published shortly by Messrs. Lawrence & Bullen, Ltd. It is the first real attempt to set forth the history of the evolution of furniture from the Tudor period onwards. One of the many features of this important work is the illustrations, which have been chosen not solely for their rarity but also because they show the styles of furniture in use by all classes of society. There will be about 1,000 illustrations, full-page and text, supplemented by about sixty fine reproductions in colour of notable examples of furniture from water colours especially done for the work by Mr. Shirley Slocum. The "History" will probably be completed in twenty monthly parts, the first of which will appear early in October, and each part will be issued at 7s. 6d. net.

The Strand Improvement.—Representations have been made to the London County Council with a view to the acquisition of that magnificent site in the Strand, having a frontage of 125ft. in that busy thoroughfare, 138ft. frontage in the new and important street, Aldwych, and 40ft. frontage facing St. Clement's Church, with the intention of erecting one huge building capable of accommodating on the ground floor the whole of the Australian State representatives, with the offices of the High Commissioner for the Commonwealth occupying the first floor. The papers are now on their way to the Victorian Government, who will in turn present them to the Commonwealth Parliament, which it is to be hoped will adopt the proposal, for it is most inconvenient for the States Government offices (as they are at present) to be separated as far apart as Bishopsgate Street, E.C., and Victoria Street, S.W.

An Oak Octagonal Pulpit has been erected in Trinity Church, Lislimnaghan, by Mr. John M'Farland, of Ballymoney. It was executed by Messrs. Harry Hems & Sons, of Exeter.

A new Arcade at Bedford is being erected between High and Harpur Streets by Mr. Cornelius Hayes, of Kempston, from designs by Messrs. Usher & Anthony. Mellowes' "Eclipse" roof-glazing is being used.

A Baptist Church at Newport, Mon., has been erected by Mr. Charles Shapland, of Maindee, from designs by Messrs. Habershon, Fawcner & Co., of Newport and Cardiff, at a cost of £1,900.

New Thames Tunnel.—Mr. W. H. Jameson, the engineer to the Stepney Borough Council, gives in his annual report some particulars about the Ratchiff-Rotherhithe tunnel which is now being built under the Thames. The tunnel will take five years and a half to build, and its total length, with the approaches, will be 6,883ft. The external diameter will be 30ft., which will allow a carriageway of 16ft. with two footways 4ft. 8½ins. wide.

A new Method of Excavating.—A Chicago contractor has hit upon a method of saving the employment of several teams of horses to haul earth out of a deep excavation. The empty wagon is driven on to a platform at the street level, the horses unhitched and the wagon lowered into the excavation by a jib crane. When loaded it is again hoisted to the platform, the horses hitched to it, and it is drawn away. The loops of the chains by which the wagon is lowered and raised are passed through the spokes and over the hubs of the wheels to prevent slipping. By this method an excavation from 15ft. to 23ft. deep and 100ft. by 200ft. in extent, was completed in sixty days.

An Exhibition at Venice.—The Municipal Council of the City of Venice announce for the year 1905 their Sixth International Art Exhibition, which will be opened on April 22nd and closed on October 31st. It will contain pictures, sculpture, drawings, engravings and objects of decorative art. The exhibition is founded by and under the administration of the Municipality. The exhibition is divided into Italian, Foreign and International rooms. The works of artists not personally invited are subject to the verdict of an International Jury of Admission. Works already shown in Italy will not be accepted at the exhibition. The City of Venice will give some honorary diplomas to the best decorated rooms and some gold medals to the best works. Articles intended for exhibition must be notified not later than January 1st, 1905.

The Hotel Astor, New York, on Broadway and Forty-fourth Street, is now nearly complete and will be opened for business shortly. It contains 500 apartments, and there are 400 fixed baths. The price of the costliest room will be 12 dols. a day and that of the humblest 2 dols. The Louis Quinze ball-room is claimed to be the finest in the world. Among other attractions are Pompeian, Chinese and Japanese apartments. Externally the style is a mixture of Italian, French and Dutch Renaissance. The building has been erected by Mr. William Waldorf Astor at a cost of 9,000,000 dols., and its possession makes the Astor families the largest owners of hotel property in the world. The opening is delayed by the building strike. Electricians and plumbers alone are required to complete the details. Meantime the 800 servants who had been engaged are kept idle. To finish the hotel the manager himself is engaging workmen, who are placed on the pay-rolls of the hotel as servants. This enables an evasion of the rule prohibiting men being engaged by the masters now fighting the unions.

Enquiries Answered

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

When were Sliding Sashes Introduced?

NEWPORT, MON.—J. A. G. writes: "Can you give me the date when deal-cased frames and sliding sashes were first introduced into use?"

Authentic information is exceedingly difficult to obtain, but so far as I am aware there are no examples of earlier date than Queen Anne's reign. G. A. T. M.

Mortgagee and Income Tax.

WORKING.—NOVICE writes: "Is a mortgagee liable to a portion of the tax levied under schedule A.; if so, what proportion, and when may it be deducted from the amount of interest?"

When paying the current year's or half-year's interest on the mortgage the mortgagee should deduct for income tax at the current rate, and should calculate it upon the amount he is then paying. The theory is, that the whole income of the particular property in question is divisible into two portions—one the portion belonging to the mortgagee and one the portion belonging to the mortgagee—each person who derives income from the property thus paying his equitable share of the tax. F. S. I.

Roof-Trusses.

LINCOLN.—G. S. writes: "What are the formulæ for working out the sizes of the different members of an iron roof-truss, span 40ft. or more? Where could I obtain a book containing comprehensive formulæ?"

The design of roof-trusses is nearly always performed by means of Clerk Maxwell's graphical methods, and the sizes of the various members made to sustain the stresses thus found. In practice these sizes are generally less than the theoretical calculation, as long experience of actual conditions has warranted. We advise you to consult Prof. Henry Adams's book, "Practical Designing of Structural Ironwork," and "Specification" (price 8s. 6d. and 3s. 3d. respectively, post free from our offices). For formulæ and other useful memoranda of this kind you should get Hurst's "Pocket-Book" (price 5s., post free).

A Builder's Office Staff.

BARNSTABLE.—J. F. N. writes: "Will you give me particulars of the arrangement of departments and number of clerks and assistants in a builder's office employing 1,000 men?"

It is impossible to give more than the most general answer to this enquiry. The arrangements of every large firm differ materially according to the various needs and conditions appertaining to the business. If a builder is not able to organize and supervise his indoor staff he had better get a manager in who has the qualifications necessary to draw up a scheme to fit the conditions of his particular business, and unfortunately most builders, although good practical men, are at sea with regard to clerical work. A builder's business employing a thousand men, or in other words the wages for which amount to about £2,000 a week, is hardly large enough to require many departments, for to be successful a builder should keep his clerical staff as small as possible. The following may be stated roughly as an office staff, which, properly supervised, is ample to deal with a business of the stated size:—1st, the estimating and

measuring department, comprising two men; 2nd, the ordering department, one man; 3rd, the prime-cost department, two men; 4th, the accounts department, two men; 5th, one cashier and ledger clerk; 6th, one chief correspondence clerk or manager, one typist and two boys. In addition to those directly in the office, the timekeepers, material clerks, and foremen must render daily returns of all goods sent out from the general stores and main depôt and those received on the job or sent away from the same, and also a week time-sheet of the labour which must agree with the time and material books kept on the various works.

Damp Resister.

DUBLIN.—J. L. D. writes: "What is the best preparation to coat over exterior cement-plastering (done two years ago) which is not proving watertight. The brick walls are gins. thick. The cement-plastering was not more than $\frac{1}{2}$ in. thick, and was not of proper quality in the first instance. Rain is coming through walls now, and to paint them is considered too expensive."

We suggest the use of the damp-resister made by Messrs. Sissons Brothers, Ltd., of Hull; but to make a really good and lasting job more expense would be necessary.

A Strange Miserere.

In our issue for April 27th last we illustrated, under this heading, a photograph sent us for identification. Mr. Harry Hems at the time remarked that he had seen the original, and believed it had been carried out under the late Sir George Gilbert Scott, R.A., at Chester Cathedral. This conjecture proves correct, although the carving is not in wood, as supposed, but is one of several jokes in stone perpetrated upon corbels under that distinguished architect's direction at the general renovation of Chester's famous cathedral about a quarter of a century ago. It is entitled "Religious Contention," and illustrates Mr. Gladstone using his learning as a fulcrum for the upsetting of the Romish Church. A corresponding corbel at the same north-east corner of the north transept is known as "Political Contention" and represents Lord Beaconsfield and Dr. Kenealy engaged in a struggle in which a coronet and a money bag are concerned.

A PHOTOGRAPHIC COMPETITION.

THE Architectural Association Camera and Cycling Club is holding a photographic competition which closes on October 1st, before which date all photographs should be sent to Mr. Gilbert H. Lovegrove, the hon. secretary, at the offices of the Association, 18, Tufton Street, Westminster. The competition is confined to sets of photographs adapted for the purpose of architectural study, and is open to members of the architectural profession and all members of the Architectural Association. Each set should consist of not more than twelve prints, and should illustrate one subject or class of subjects. A competitor may submit any number of sets. The photographs will be approved by the Committee of the Camera and Cycling Club as having reached a fair standard of technical excellence, and will then be finally adjudged by a gentleman, not a photographer, who is an expert in architectural tuition, and who will be chosen by the President of the Architectural Association. His name will be declared before the end of March. Copies of the winning prints by a permanent process must be deposited with the Architectural Association before the prize of three guineas in the form of books or apparatus is presented to the winner.

Builders' Notes.

The New York Building Strike is spreading. It is estimated that a capital of £5,000,000 invested in the building business will have to lie idle for perhaps a year. The majority of leases in this city now begin in October, and the workmen by choosing this time to strike will prevent the completion of many important structures in time for the October rentals.

An Irish Dispute.—A dispute has occurred between the Incorporated Brick and Stone Layers Society and Mr. J. Langley, Ringsend, who is at present carrying out a contract at the Criminal Lunatic Asylum, Dundrum. The question involves the operation of the fair wages clause on public contracts, as well as an alleged breach of the rules jointly agreed to by the employers and employed.

A Canadian Strike.—The week before last the builders' labourers at Toronto struck work for an advance in wages from 25 cents to 28 cents an hour, causing a serious interruption of building operations. Several conferences held with the employers to arrange a settlement having proved fruitless, last week the Bricklayers' Union, by an overwhelming majority, decided that all its members should cease work in support of the builders' labourers. About 1,200 men are idle. Both sides are determined, and there are prospects of a long and bitter struggle. The carpenters and stonemasons are still at work, but unless a settlement is soon effected it is probable that they will also come out.

A Test on Uralite.—On August 29th a demonstration was given by the British Uralite Co., Ltd., of the fire-resisting properties of their building material, known as Uralite, in Crown Street, Liverpool. It was witnessed by Chief Superintendent Thomas, of the City Fire Brigade, and members of his staff, many prominent architects and representatives of the local railway, dock and shipping companies and members of the Press. A wooden partition, platform and box, all covered with Uralite, were subjected to fire. The astonishing result of the test was that while the box was subjected externally to a heat of 2,100 degs. internally scarcely 100 degs. was registered. The box contained various documents, which were handed round to the spectators in an absolutely undamaged condition after the fire had been extinguished.

The British Association, in connection with its recent annual meeting, paid a visit to the works of the Saxon Portland Cement Co., Ltd., of Cambridge. The process of cement manufacture from the quarrying of the marl to the storage of the finished cement was fully explained, and the system of mechanical and chemical tests adopted to ensure absolute uniformity and high quality in the manufacture of the cement was explained. The adjoining works of the Atlas Stone Co., Ltd., were also open to the inspection of the members. This company had laid down modern hydraulic and electric plant for the manufacture of artificial stone paving flags, and the operations of specially crushing the granite chippings to the required size and the automatic elevating, weighing and mixing plant were shown in operation. Interesting tests to illustrate the hardening process imparted to paving flags were conducted, and the effects of age hardening the flags were shown by means of tests made upon flags from the company's stock.

The new City of London By-laws relating to building operations are not to be allowed to become a dead letter. Last week a contractor was summoned for removing materials from a building in Arthur Street West, in course of demolition, during the prohibited hours. The defendant pleaded that his men were only clearing out the

foundation and taking down the hoarding, and that the by-law did not therefore apply. He next explained that he was bound by contract under a penalty of £20 a week to get the work done by a certain time, and that he had been hindered by the taking up of the street. As it was the first case under the by-laws, the summons was dismissed with a caution.

The Cottage Hospital, Acton, is being warmed and ventilated by Shorland's patent Manchester stoves with descending smoke flues, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

Messrs. J. Hodson & Son, the well-known quarry owners, stone merchants and contractors, of Lenton Boulevard, Nottingham, have registered their business as a limited company for family reasons; there is no alteration in the management. The business will in future be carried on as J. Hodson & Son, Ltd.

Fire Resistance.—Mr. E. M. Fox, who presided at the annual meeting of the Fire Resisting Corporation last week, said that as regards the progress of the business taken over from the Non-Flammable Wood and Fabrics Company the works at Fulham were very busily engaged treating wood for the new electric carriages of the District Railway Company, and they had in hand sufficient orders in this department to keep them fully employed for several months to come. The margin of profit was small, but he hoped later on, when the advantages of the system became better known, that they would get a more remunerative return from the users of such wood. The theatrical scenery business was progressing satisfactorily, and here a larger margin of profit was shown, but the volume of business was not very great. It was, however, growing, and they had orders in hand enough to keep them going for several weeks at good prices. As to the contemplated debenture issue, they might after all be able to get on without having to raise that money, owing to the assistance of one of the directors, who had lent the company £3,000. The outlook for their business was, on the whole, very hopeful, and public interest in the question of fire prevention was growing rapidly. The company's Fulham works were in first-class order, and no efforts would be wanting to conduct the business on diligent and enterprising lines.

Business Outlook in the United States.—In an article on this subject in the "Times" it is stated that the domestic financial condition is satisfactory and promising for the future. The days of "booms" have passed, probably not to return for several years. Railroad-building is not going on in any great way, because as there is no demand for many new lines so there is no supply. For the time the existing trunk lines are adequate to the needs of a trade slowly changing in character. In manufactures the absence of speculative activity is quite as apparent as it is in railroads. The boom times encourage the manufacture of iron and steel for Wall Street and not for a fair, honest, open market in which the products would be sold to real customers at remunerative prices and reasonable profits. They promoted a rage for building, and in the States, to an infinitely greater degree than anywhere else in the world, the steel trade has become an adjunct of the builder's enterprise. Americans no longer have architecture in

business or in most public buildings; they have learned better than that, and so have substituted engineering. The same is true in bridges to a greater degree even than is known in England, in spite of her metallic monstrosities spanning the Thames. But even the deficiencies incident to six or seven lean years may soon be overcome by a short period of undue activity. It was hardly to be expected that business buildings of infinite height should be in unlimited demand, and so there has come a respite. The building trade, one of the most important in all Northern and Western countries, is one that cannot enter into accurate statistical account. It is so widespread and also so local that it eludes enquiry. The trade, too, has been somewhat checked by demand owing to the fact that the operations of supply went on with great activity from 1898 until 1903. It has been subjected to an abnormal check in cities like Chicago and New York by reason of local trade union exactions that were both impudent and suicidal. In both these cities rents have risen, and the great body of labourers are paying annually over and over again for the folly and, in some cases, for the crimes of the few. Business building has thus been seriously affected, and to some degree domestic construction has shared in the bad effects. But even in this respect the standard of living, the rigid municipal regulations and philanthropic effort, have all united in forcing, almost out of due time, a higher order of housing, so that where wages have not been extravagant and abnormal they have at least been good.

German Cement Combine.—It is reported from Berlin that efforts to organize syndicates in the cement industry continue to be made. Lively negotiations between the various works in the Rhenish-Westphalian district are in progress, and it is hoped with considerable confidence that the existing common selling agency at Bochum will become in a short time the executive of a firmly organized syndicate. A project has been drawn up for a combination of the thirty establishments in that part of the country. It is also expected that the establishments in the Province of Hanover will soon combine, and the plan is then to secure a working arrangement between the two combinations.

Trade and Craft.

A Contractor's Trolley.

We illustrate on this page a trolley of a new design which has been made by Messrs. Barrows & Co., Ltd., the well-known engineers, of Banbury, specially to meet the requirements of builders and contractors. It is strongly made with oak framing and solid plank sides, mounted on springs and cross spring, with wheels fitted with "Drabble's" patent arms and boxes with brass oil caps. It is constructed for carrying slates, long pieces of timber or poles, which, by means of the front bolster (portable), the load can be carried well over the horse's head. The front, tail, and also bolster, are plated with iron to prevent wear. The front wheels are made to lock under, and the trolley turns on its own ground. The whole of the workmanship and materials are of the highest quality throughout, and the whole is neatly painted, lined and varnished. A pair of shafts for one horse, or pole for a pair, skid shoe and tie chain to wheel, are included in equipment. Three sizes are made:—No. 1, with body 8ft. 3ins. by 3ft. 9ins., to carry 1 ton, 2in. wheels, price £32; No. 2, with body 9ft. by 4ft. 2in., to carry 2 tons, 2½in. wheels, price £38; and No. 3, with body, 11ft. 9ins. by 4ft. 1in., to carry 4 tons, 3½in. wheels, price £48.

Acle Church.—The parish church of St. Edmund, King and Martyr, Acle, Norfolk, has been repaired by Messrs. Chaston & Grimson, of Loddon, from the designs of Mr. Herbert Green, diocesan surveyor, of Norwich. It consists of nave, chancel, north and south porch with rooms over, and a circular western tower. The tower is the earliest portion of the church and is of Early English date. The work now carried out comprises the restoration of the roof to the nave. The outside has been stripped and re-thatched (presumably it has always been covered with this material, being in the Broad District). The underside of the roof was formerly plastered, and this has been removed. The underside of the roof timbers have been clad with oak boarding, adorned with carved bosses and moulded oak ribs. The walls, windows, buttresses and copings have been repaired and the walls coloured inside. New lamps have been hung from the roofs. The tower and north porch is the next work to be taken in hand.

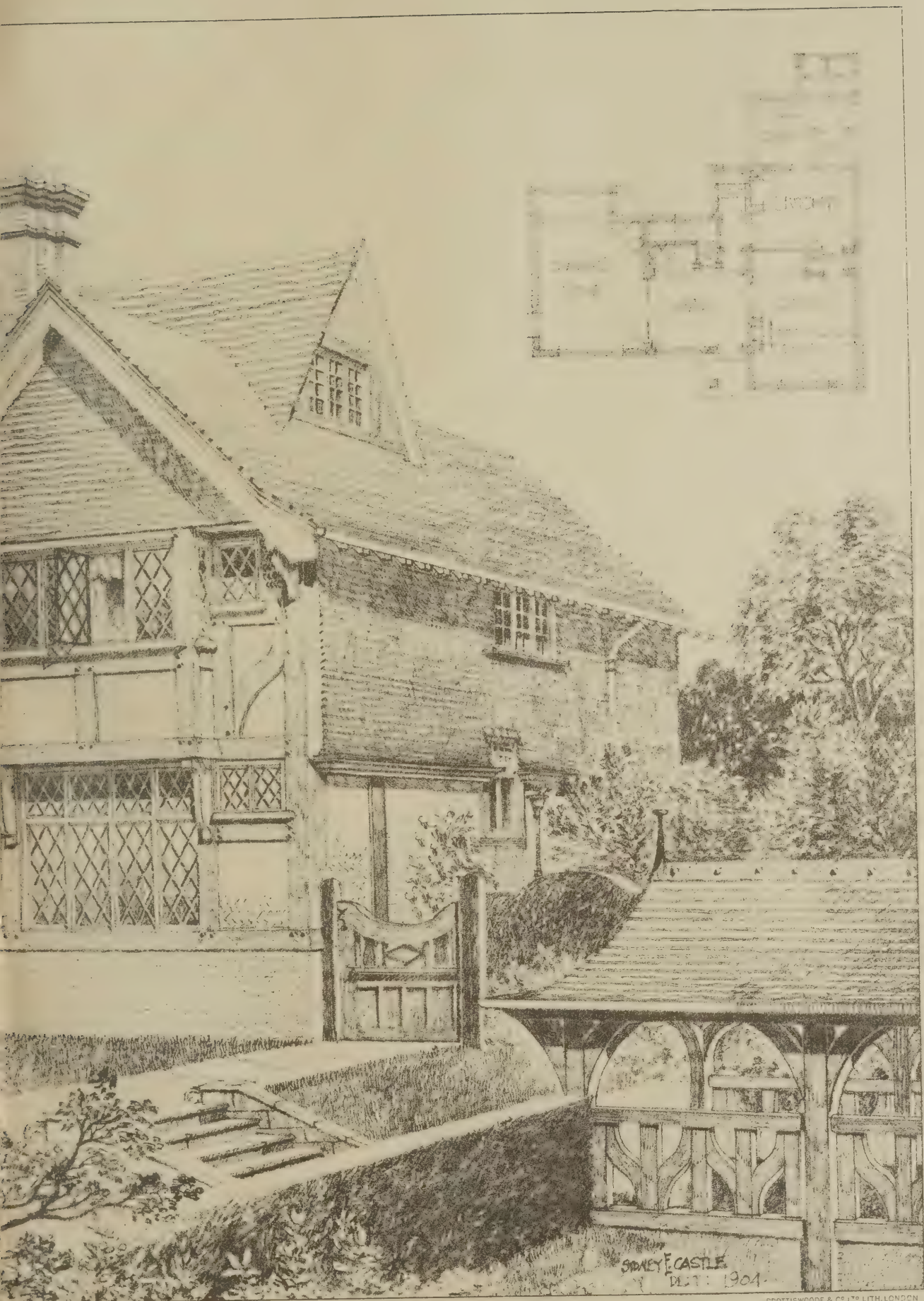


A TROLLEY OF NEW DESIGN FOR CONTRACTORS.

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HOUSE AT REHMANSTON VILLAGE
DESIGNED FOR F. D. MONTGOMERIE ESQ.
BY J. H. HADWICK ARCHT



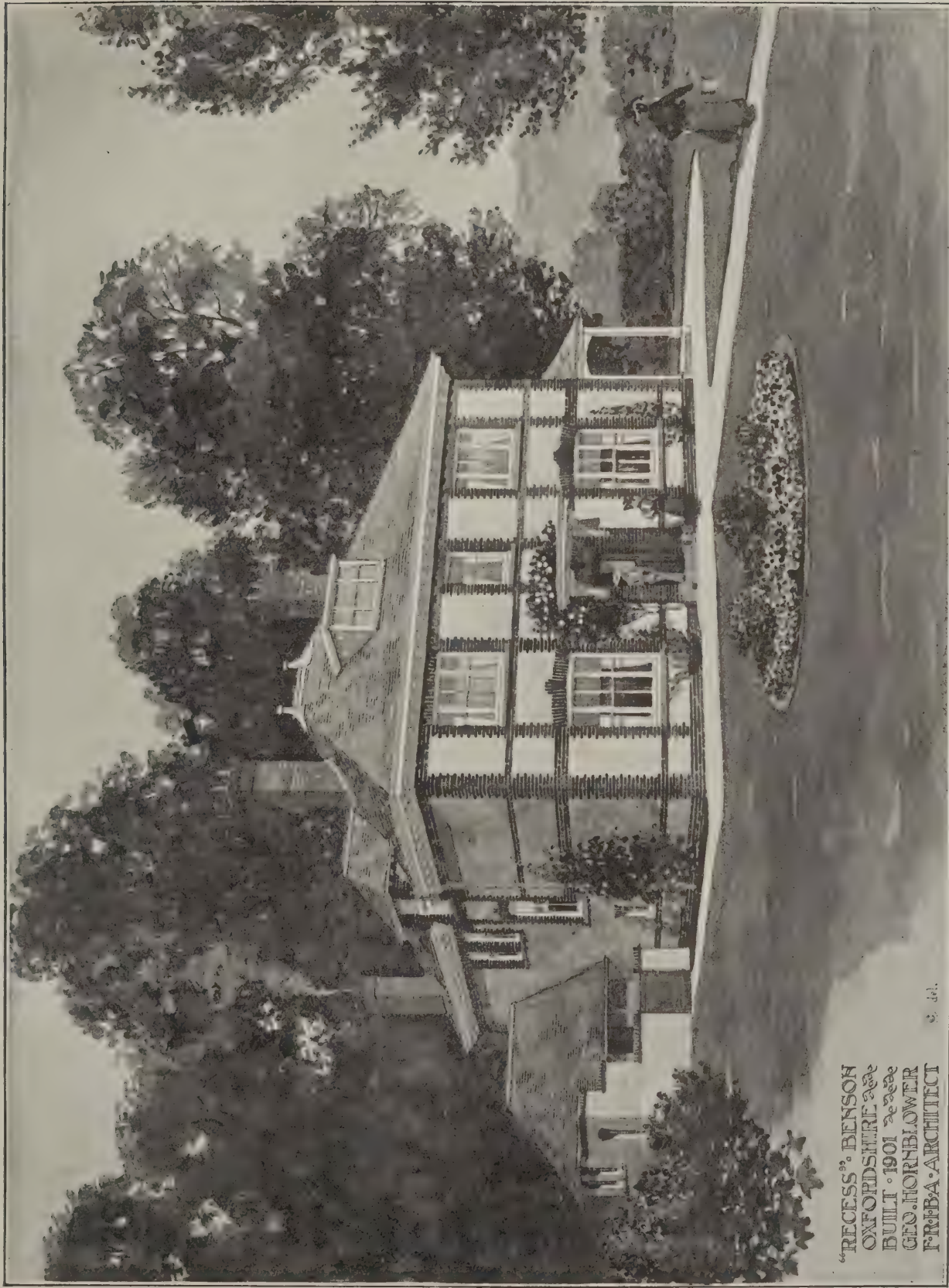
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THE MANSION HOUSE OF ROSEHAUGH ROSS-SHIRE N.B.: VIEW FROM THE LOWER TERRACE. WILLIAM FLOCKHART F.R.I.B.A., ARCHITECT. (ROYAL ACADEMY EXHIBITION 1904.)

Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, September 14th, 1904.



"RECESS" BENSON
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THE
BUILDERS' JOURNAL
AND ARCHITECTURAL RECORD.

September 14, 1904. Vol. 20, No. 501.

6, Great New Street, Fetter Lane, E.C.

Summary.

We commence this week a new regular feature—a monthly article on the London timber trade. August was a quiet month for the wood trade, and the market is perhaps all the better for its rest. The importation has been on a very moderate scale, while the deliveries from the docks have just turned the corner and beaten those of August last year by 200 standards. Prices have kept steady at the low current level, with a tendency to some further weakness in battens and to some slight recovery in flooring. Notwithstanding the continued depression in the soft wood trade, the hardwood market has been in a sound, if quiet, condition. (Page 137.)

The invariable object of the Greeks in selecting a site was to find the position which most perfectly displayed and set off the beauty of the building. The beauty of the building in Greek eyes was the use of it. That was its *raison d'être*. The position that best displayed its beauty was the most useful position therefore that it could occupy. (Page 135.)

In tropical countries corrugated iron buildings are almost invariably erected on small cast-iron foundation columns, which raise them from 2ft. to 3ft. above the ground, and thus lessen the chances of catching malarial fever, and guard against the white ant and other insects. (Page 143.)

Transverse breaking tests made on plate glass at the Watertown Arsenal give the modulus of rupture as from 2,000 lbs. to 8,000 lbs. per sq. in., generally greater with the lesser thicknesses. The strength of glass set in frames was practically double that of the specimens tested transversely. (Page 143.)

Mr. Richardson substitutes for the old theory of silico-aluminates in Portland cement the simple theory of solid solutions, which has already had such an important bearing on the chemistry of steel. In Mr. Richardson's view Portland cement consists of solid solutions of aluminates in silicates. This hypothesis is suggestive. It points, for instance, that in cement, as in steel, the rate of cooling of the clinker has a very marked effect on its properties, and it seems highly probable that the relations between low, medium and high steels will be found duplicated in low, medium and hard clinkers. The fact of solid diffusion shows that the grinding of the raw materials probably has an economical aspect that has not been appreciated previously. The conversion of the mixed ingredients into clinkers is shown to take place at a temperature below the fusing point. (Page 139.)

SPECIFICATION No. 7 is now entirely sold out, and if any readers have copies to dispose of we shall be glad to buy them back in order to supply those especially anxious to obtain copies. Letters should be addressed to the Publisher, "Specification," 6, Great New Street, London, E.C.

An Invitation. THE value of a man's services just depends on the use they can be put to, which varies in different localities, but we should hardly have thought that a foreman was worth twice as much as a surveyor: yet such appears to be the case at Sheringham, that growing little place near Cromer, for we have an advertisement before us inviting applicants for the posts of clerk, surveyor and foreman to the urban district council. The clerk's salary is given as £110 a year, the surveyor's £35 a year, and the foreman's 30s. a week (*i.e.*, £78 a year). The terms are not flattering to the surveyor, more especially when it is remembered that he is required to provide an office within the district and, in addition to the usual duties, he has to look after the sea defence works—no light responsibility. Only quite recently 100,000 tons of cliff fell down below the lighthouse at Cromer.

Amateur Restorers. ON several occasions, at one time and another, we have had our attention drawn to the work of amateur builders and restorers who have not possessed sufficient money to employ others to do the work for them. Such instances are chiefly connected with churches and chapels, the congregations of which convert themselves into building gangs during their spare hours. The work, however, is generally on a small scale, such as the erection of an annexe or painting, glazing and whitewashing anew. But something very much more extensive now meets the eye at St. Andrew's Church, Bordesley, Birmingham, where the work of restoration, commenced nearly four years ago, has just reached its height in the demolition of the church steeple, which, owing to previous neglect and the corrosive action of the acids in the Birmingham atmosphere on the red sandstone of which the spire was built, became so unstable that it was condemned by the Corporation. A considerable amount of the work of restoration has been done through the agency of a labour bureau formed by the vicar, the Rev. J. H. Richards. From the many applicants for parochial relief whose claims the church was asked to meet, he selected, according to their trade, a number of workers, who have been paid at a lower rate than that recognized by trade unions. Much, however, has been done by purely voluntary labourers during their leisure time. Of all the work undertaken by this enthusiastic band, the demolition of the steeple is undoubtedly the most noteworthy. Night after night the sturdy parishioners have worked for many hours at their task under the lurid glare of the flare light. The task, it is satisfactory to learn, has been so far accomplished with-

out the slightest accident, thanks largely to the supervision of Mr. A. E. Douglas, whose training as an engineer has been of the utmost value in the many emergencies that have arisen in connection with the work. It is expected that the last stone will be removed next month, when the work of reconstruction will be begun. Then the workmen will set about the restoration of the roof, which it is hoped to complete before Christmas. Next year it is proposed to put stone embattlements round the top of the tower. At the present the work of restoration is being hampered somewhat by the want of funds for the necessary materials.

Aylesford Bridge Threatened. THOUGH a lot of people eager to see their names in print manage to crowd lengthy letters into the newspapers, convincing nobody of anything except the writers' stupidity, and though the many false cries of "Wolf" so raised have reacted on the public as one would expect them to do, the fact remains that very great influence can be exerted through the Press on persons and corporate bodies who would otherwise be unassailable. In our own particular province, we need only recall the two most recent cases of All Hallows, Lombard Street, and the Whitgift Hospital, Croydon, in order to prove this fact. And in the majority of such cases the agitation has taken shape in a letter from some zealous advocate. Mr. George Clinch writes to the "Times" in reference to the delightful bridge that spans the Medway at Aylesford, dating partly from the fifteenth century, and which the authorities propose to demolish in favour of a new bridge. The Society for the Protection of Ancient Buildings has drawn up a scheme by which a new cut would be made in the river for the purposes of navigation. This would be commenced about 300 yards above the bridge, and would run in a direction practically parallel with the line of railway. Over this cut, at a point nearly opposite the railway crossing, the new bridge would be built, with another bridge in continuation of it over the railway, thus superseding the dangerous level crossing. The road, approaching from the south, would commence to rise at the point where it joined that from the railway station, and would be carried on an embankment until it reached the railway, over which there would be a bridge in one span. The newly constructed channel or cut in the river would also be spanned by a bridge of one arch. The new raised roadway would be continued to the existing bridge, which might be widened for foot-passenger traffic by means of timber staging. In this way the whole of the fine old bridge at Aylesford might be saved.

THE "GATE LODGE," GLASGOW UNIVERSITY.

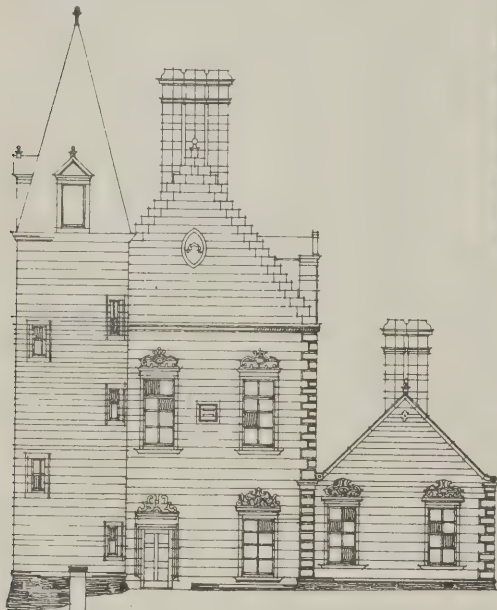
THIS interesting memorial of the old Glasgow College or University which once stood in the High Street is now at the north-east entrance to the grounds of Gilmorehill. Thanks are due to the governing body of the University, who had the foresight to insert in the Act of Parliament which authorized the sale of the old buildings



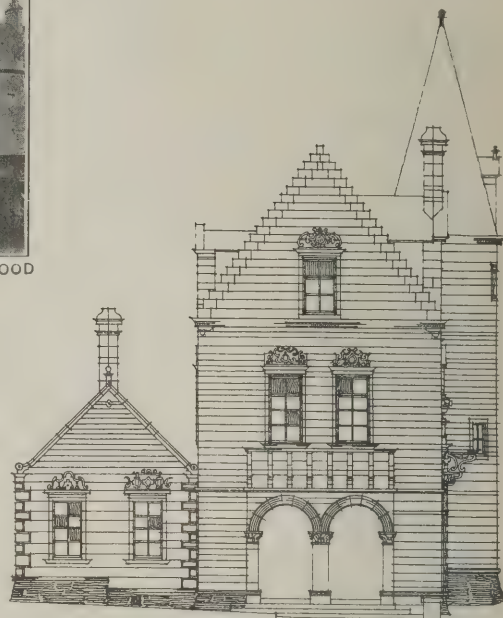
THE OLD GLASGOW COLLEGE AS IT STOOD
IN THE HIGH STREET, 1869.

a clause reserving a right of property to all carved stones in the old University front, also to the generosity of the late Sir William Pearce, Bart., the famous shipbuilder, who paid the cost of transferring and erecting the memorial. The architect who carried out the work was Mr. A. G. Thomson; he died very recently. An examination of photographs of the old buildings shows that the entrance, an arched opening, stood in the centre of the University front, the jambs and voussoirs of which were heavily rusticated. The archway was crowned by a heavy cornice, and directly above the open-

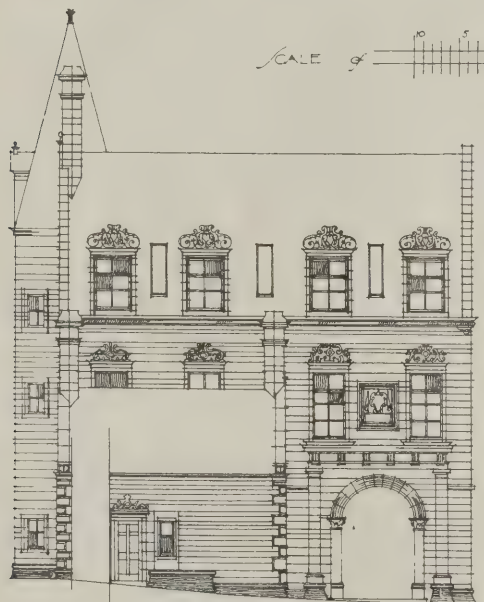
after the restoration of Charles II. to the throne. The measured drawings of the "Gate Lodge" reproduced on this and the opposite page were awarded the "Glasgow Institute of Architects" prize at the Glasgow and West of Scotland Technical College last session (1903-4). The attention of students might be more often directed to such useful studies rather than persistently measuring well-known buildings already adequately represented.



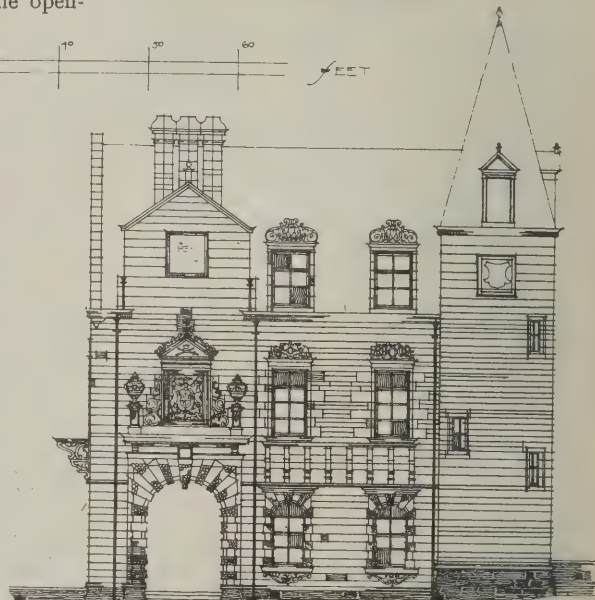
WEST ELEVATION.



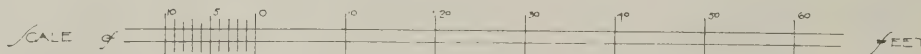
EAST ELEVATION.



SOUTH ELEVATION.

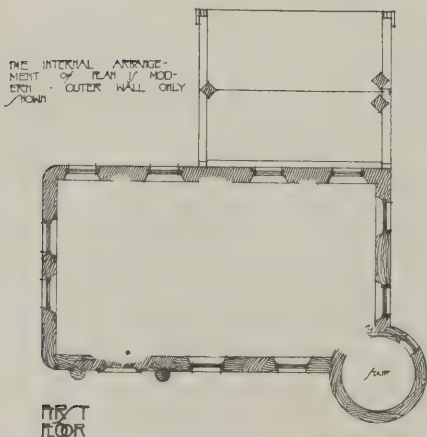


NORTH ELEVATION.

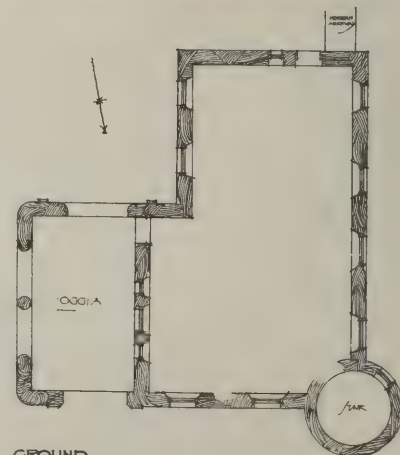


ing was an enriched panel containing the coat-of-arms. On either side of the panel were ornamental vases supported by the cornice and bound to the panel by the band or ribbon treatment characteristic of all Scottish works. Above the entrance was the gable with its chimney stacks, as in the restoration. The design of the old buildings being symmetrical, the windows and balconies on the first floor as restored were placed equally on either side of the entrance. The dormer windows were similarly treated. As will be seen from the accompanying drawings (by Mr. W. J. Anderson, of Glasgow), the restorer has placed the old entrance with its features at the east end of the north

elevation of the lodge, removing one of the side balconies to the east elevation. At the north-west corner a turret has been built which encloses a staircase leading to the rooms reserved for naval architecture. All the western windows were taken from the extension which was made to the old front a few years after the latter was built. The windows on the ground floor and the panel in the gable of the north side are modern. The arcading on the east, the archway on the south elevation, and the turret at the north-west corner are also modern. Other modern details are the wall-head, crow steps and base mould to the main building, and skew and base moulds to the adjunct. The date 1658 is to be found in the panel in the west elevation, and the letters C.R., in the panel above the entrance, but it is believed that the latter were scribed



FIRST
FLOOR



GROUND
FLOOR

GREEK SITES.

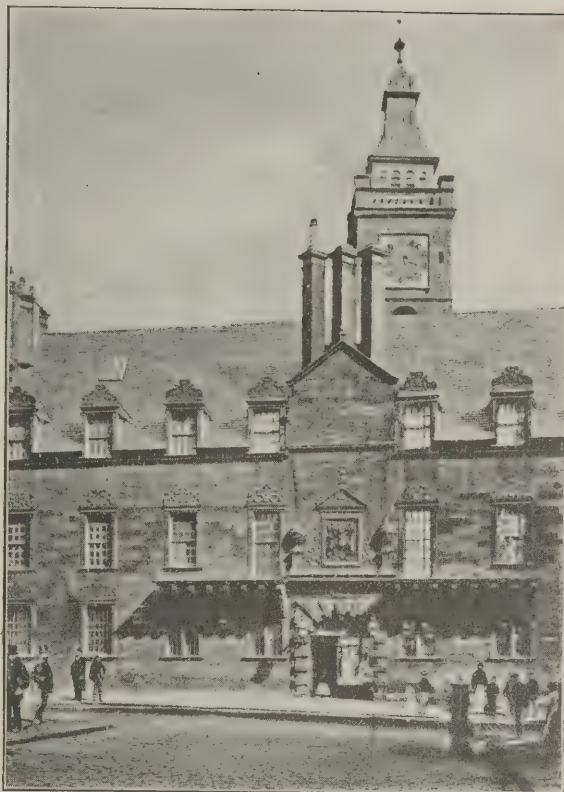
NOTHING is more characteristic of the Greek view of art than the choice of sites for their temples. The difference in this respect between them and other races is one that may be traced down through the details of the treatment of architecture, and points to a peculiarity in their view of the functions and uses of art. The invariable object of the Greeks in selecting a site was to find the position which most perfectly displayed and set off the beauty of the building. The beauty of the building in Greek eyes was the use of it. That was its *raison d'être*. The position that best displayed its beauty was the most useful position therefore that it could occupy.

Even at this day it would be difficult to over-estimate the charm and dignity that is added to the ruined remains of Greek temples by this method of placing. It often seems as if Nature herself had arranged her own proportions with a view to their convenience, and in the modelling of her hills and valleys had been guided by the purpose

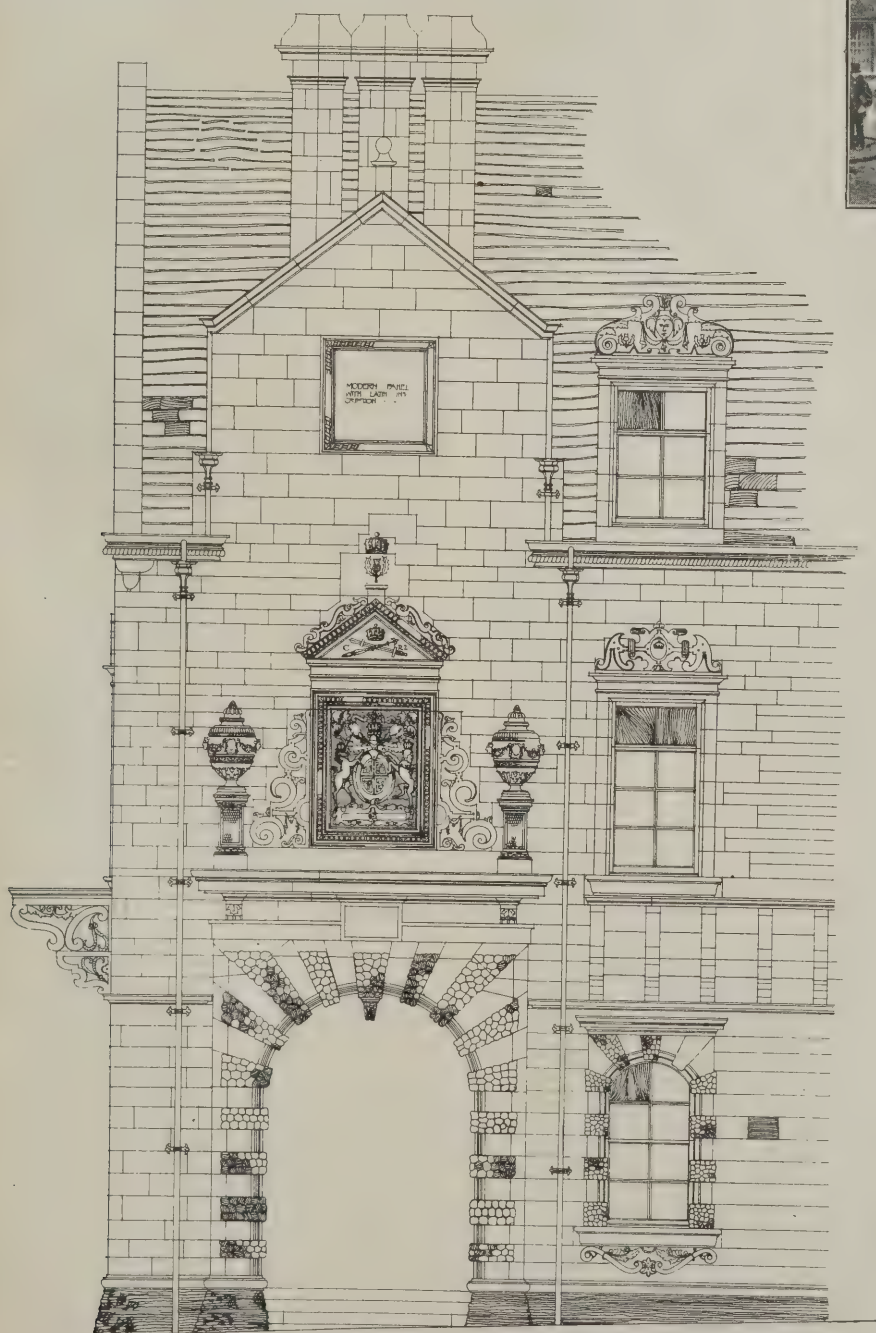
of affording to these works of art the most advantageous position possible. Standing as they do, they appear to preside over the scenery, the irregular and wild beauty of which finds in these ordered and stately constructions its approximate climax of expression. One of the most charmingly-placed temples the writer remembers is Segesta, in mid-Sicily.

More lovely still is the setting of the temples at Girgenti, which stand in a line along the cliff overlooking the sea.

The most famous example is the Acropolis at Athens, a little eminence of precisely the right height and dimensions, rising sharply from the plain and commanding the attention not only of the town and its environs but of the encircling mountains, of the rich valley leading to the Piræus and of the blue expanse



PRINCIPAL ENTRANCE TO OLD GLASGOW COLLEGE.



Scale of 1" = 10' 0"

DETAIL OF ENTRANCE TO GLASGOW UNIVERSITY: NORTH ELEVATION.

of the Gulf of Ægina, ruffled in old days by Athens' fleet.

It is evident that in this placing of their temples the Greeks were only carrying out to its logical conclusion the same principle that they applied to the details of their architecture. They were but reiterating their guiding maxim that every touch must tell, that the disposition of every part must be regulated by a strict regard for its more easy and perfect display. What a single metope was to the frieze, what the frieze was to the entire entablature, what the entablature was to the whole temple, that the temple itself was to the landscape. The conception was altogether a Greek one. With seven hills to choose from, the Romans built all their principal temples in a ditch, for the Forum is little more.

Most English or European churches and cathedrals are built in the midst of the thickest parts of towns and great cities.

It is curious, perhaps, that we should make no better provision for seeing what we all declare to be so beautiful. If these things, one cannot but think, were, in the Greek sense of the word, beautiful—if we got, that is to say, strength and succour and light from them—is it to be supposed that we should submit to be cut off from such resources? The fact is we are wiser in our practice than in our theory. However confidently we may maintain the beauty of our great buildings, it is only necessary to consider our treatment and disposal of them to see that we do not derive the virtue from them that beauty possesses. We call them beautiful things, but we do not use them as beautiful things. This is just what the Greeks did do, and it is the point of difference between their art and ours. They considered their temples as objects the highest function of which was to be seen. No other use the building could be put to was equal to that. No sermon preached within it was equal to the sermon preached by its own proportions and aspect. Such a view of the matter is a strange one to us, but, all the more for that, perhaps, it is worth considering. It shows the seriousness that the subject of art can attain to among a people who really live by art.—L. MARCH PHILLIPPS (in the "Speaker").



THE MANSION HOUSE OF ROSEHAUGH, ROSS-SHIRE, N.B.: FROM THE LOWER TERRACE.
WILLIAM FLOCKHART, F.R.I.B.A., ARCHITECT.

OUR PLATES.

THE sketches we publish of the Mansion House of Rosehaugh were hung in this year's Academy, and are very beautiful examples of Mr. Flockhart's remarkable ability as a draughtsman. These sketches were among the best in the architectural room, while the originality and power of the architectural design is considerable. Our reproductions unfortunately cannot suggest the colouring, in which is their greatest charm. The building of which these sketches represent various portions has been recently completed, the whole of the general contract being carried out by Messrs. Foster & Dicksee, of Rugby. The building is built of stone from two local quarries, the dressings and architectural features being in grey sandstone from a quarry on the site, and the general walling of red sandstone from a quarry in the neighbourhood. Internally the various rooms have been finished in distinctive styles, of which we illustrate two of the bedrooms: one in the Jacobean style and one in the Elizabethan style. The

fireplace shown in one illustration originally belonged to the Old Palace of James I., Bromley, Kent. Throughout the house many fine examples of antique chimney-pieces, doorways, tapestries and other works of art have been fitted up. In fact the house is largely a museum of antiquities.

"Greenhay" (originally called the "Recess" and so titled on the drawing which was made before the change) is a river-side cottage at Benson, Oxfordshire, which was built in 1901 for Mr. William Neill on a site near the old ferry to the Berkshire side of the Thames. The walls are faced with the beautiful silvery-grey local bricks, the quoins, arches, &c., being in red bricks of Poulton & Co.'s make. The roofs are covered with small green slates. Messrs. Brasher & Sons, of Wallingford, were the builders, the architect being Mr. George Hornblower, F.R.I.B.A., of London. The plan is reproduced on p. 143.

The house at Roehampton Village, Surrey, has lately been completed and is of brick and timber with Reading tiles for walls and roofs. The details are kept simple in

character and the timber-work externally is oak, with pins projecting. The hall, which forms a sitting-room, is panelled up to a frieze, and the angle under the stairs is kept in character. The whole of the rooms are lighted by windows with diagonal leaded glass in large divisions, and the house has been designed to suggest the quaint simplicity of an old Sussex farmhouse. The work was executed by Mr. Eden D. Hobbs, builder, of Thames Ditton, Surrey. Mr. A. Jessop Hardwick was the architect.

Obituary.

Mr. J. Mitchell, carpenter and builder, of Grange, died last week.

Mr. J. Taylor, joiner and builder, of Farnworth, was buried last week. He was eighty-eight years of age.

The late Mr. David Hughes, J.P., builder, of Liverpool and Cemaes, left estate value £156,236 gross.

Mr. Henry Ford, builder, of Leytonstone, aged sixty, died recently as the result of dislocation of the neck caused by a fall down stairs.

Sir James Steel, a former Lord Provost of Edinburgh, died recently. He was born in 1830. About thirty-eight years ago he began business in Edinburgh as a builder, and during his business career he was associated with the erection of some of the principal buildings in the city. Among the bequests of his will are funds for assisting masons, joiners and other workmen connected with the building trade.

Mr. James Sellers, architect, of Bury and Radcliffe, recently died at Blackpool, from cerebral hemorrhage, accelerated by slipping on a banana skin on the pavement. At the inquest the jury drew the attention of the Blackpool Corporation to the dangerous habit of thus throwing down these skins. He was sixty-one years of age and had superintended the erection of several public institutions, including the Bealey Convalescent Home, opened recently.

A HOUSE FOR ANIMALS.

A NEW house at the Zoological Gardens for small carnivora has been erected to replace the small Mammals House in the South Garden. The house which has disappeared was one of the early erections. In February last the new structure was begun, so that it has been finished in about six months. It is 72ft. long by 35ft wide, and is lit from above by means of a lantern, which also serves the purpose of ventilation. There is a double row of cages in the building, with a central passage for visitors. On the inner side are five large and nine smaller cages, separated by a door leading into the keeper's room, stores and heating chamber. On the outer side are also fourteen cages, each communicating, by means of a drop-door, with glass-roofed cages in the open. There is no passage between, as in the lion-house, but immediately the door is raised, which is done by lowering a weight, the animal can pass out into the fresh air. The cages are separated by iron partitions, which can be shifted, so as to increase the dimensions of any given cage, or by the use of additional partitions the number of cages can be increased. A small door in each partition allows the keeper to pass from one to another of the outside cages for the purpose of cleaning them, the animals meanwhile being shut inside. For the purpose of cleaning the corresponding inside cages the animals are turned out, and the cages are entered from the inside of the house.



THE MANSION HOUSE OF ROSEHAUGH ROSS-SHIRE, N.B.: WILLIAM AND MARY BEDROOM.

THE TIMBER TRADE.

The London Market in August.

AUGUST was, as usual, a quiet month for the London wood trade, and the market is perhaps all the better for its rest. The importation has been on a very moderate

depression in the soft wood trade, the hardwood market has been in a sound, if quiet, condition, and a sober feeling exists that the general trade of the country being quiet the timber trade must be adjusted accordingly.

The abstract of stock, consumption, &c., for the month of August, published by Messrs. Foy, Morgan & Co., is as follows:—

S.C. Dks. and M. Dks.	Deals (Fir.)	Battens (Fir.)	Pine.	Spruce.	Pitch-pine Deals.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.
Public dock stock - - - - -	1,613,196	3,118,539	1,155,194	929,182	81,915
Monthly public dock consumption - - -	207,827	479,601	80,951	118,744	8,967
Overside stock - - - - -	635,951	1,467,579	247,710	363,357	—
Overside consumption (estimated of dock): -					
78 per cent. Sawn - - - - -	162,105	374,039	63,142	92,620	—
51 " Planed - - - - -					
Duration of supply at same rate of consumption - - - - -	6'03 months.	5'84 months.	9'74 months.	6'12 months.	9'47 months.

S.C. Dks. and M. Dks.	Deal and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
	Pieces.	Pieces.	Pieces.	Loads.
Public dock stock - - - - -	7,301,726	4,281,966	6,700,779	29,500
Monthly public dock stock consumption - - -	896,090	389,207	1,097,892	4,187
Overside stock - - - - -	2,714,597	1,190,973	491,051	—
Overside consumption (estimated of dock): -				
78 per cent. Sawn - - - - -	691,956	303,581	559,925	—
51 " Planed - - - - -				
Duration of supply at same rate of consumption - - - - -	6'31 months.	7'90 months.	4'14 months.	7'05 months.

scale, while the deliveries from the docks have just turned the corner and beaten those of August last year by 200 standards. Prices have kept steady at the low current level, with a tendency to some further weakness in battens and to some slight recovery in flooring. A reduction of over 6,000 standards in the overside trade goes to show how lightly this market is committed to importation for its autumn and spring demands, and this, together with the low level of prices, continues to point to steadier trade prospects for the future. Buyers are naturally nervous after the grievous difficulties they have had to face for so long during the reduction of prices from the inflated levels of recent years. Their fears at present are in the direction of too ample consignments to London by shippers who have not been able to sell as much as they require to export. The probability, Messrs. Churchill & Sim, the well-known timber brokers, report, is that these consignments are not likely to be made in any larger quantity than this market is well accustomed to. If they are, they will have to be sold very cheaply, and buyers, not holding much imported stock, will reap the benefit. If they are not, the market may almost be in danger of being too lightly supplied for its requirements.

Messrs. Denny, Mott & Dickson, Ltd., report that, notwithstanding the continued

Dock Stocks in August.

Summarizing this, we find the stock of wood in the public docks on August 31st was:

Foreign deals and ends - - -	2,000,000
Do. battens - - - - -	3,216,000
Do. boards, rough - - - -	4,282,000
Do. do. prepared - - - -	6,700,000
Colonial pine deals and battens -	1,156,000
Do. spruce do. do. - - -	930,000

Totalling 18,284,000 pieces as against 18,466,000 pieces in August, 1903, and 22,050,000 pieces in August, 1902. In every kind there is a diminution.

In other kinds the stock is as follows:—

Foreign wainscot logs - - -	553 pieces.
Do. oak timber - - - - -	823 loads.
Do. fir timber - - - - -	1,056 do.
Do. Oregon pine, &c., spars and masts - - - - -	4,418 do.
Colonial oak timber - - - -	1,588 do.
Do. birch timber and planks -	5,063 do.
Do. elm and ash timber - -	1,150 do.
Do. yellow pine - - - - -	594 do.
Do. red pine - - - - -	271 do.
United States pitch-pine timber -	22,686 do.
Do. do. deals - - - - -	85,000 pieces.
East India teak - - - - -	9,555 loads.

Dock Deliveries for Eight Months.

The deliveries for the first eight months at the public docks have been of:—

Foreign deals and ends - - -	2,271,700
Do. battens - - - - -	4,273,000
Do. boards, rough - - - -	3,772,000
Do. do. prepared - - - -	11,008,000
Colonial pine deals and battens -	752,000
Do. spruce do. do. - - -	1,139,000

A total of 23,215,000 pieces as against 24,809,000 in 1903, and 25,794,000 in 1902, or, stated in cubical contents:—

Sawn woods - 98,516 P.s.h.	104,770	115,227
Prepared boards 34,807 P.s.h.	36,551	38,744
Timber - 47,499 loads	51,958	55,952

Dock Deliveries for August.

The deliveries for August were:—

Foreign deals and ends - - -	248,000
Do. battens - - - - -	446,000
Do. boards, rough - - - -	394,000
Do. do. prepared - - - -	1,094,000
Colonial pine, deals and battens -	84,000
Do. spruce do. do. - - -	121,000

A total of 2,387,000 pieces as against 2,442,000 in August, 1903, and 2,832,000 in August, 1902, or, in cubical contents:—

Sawn wood - 10,417 P.s.h.	10,180	10,833
Prepared boards 3,674 do.	3,654	4,675
Timber - 5,540 loads	6,656	5,867

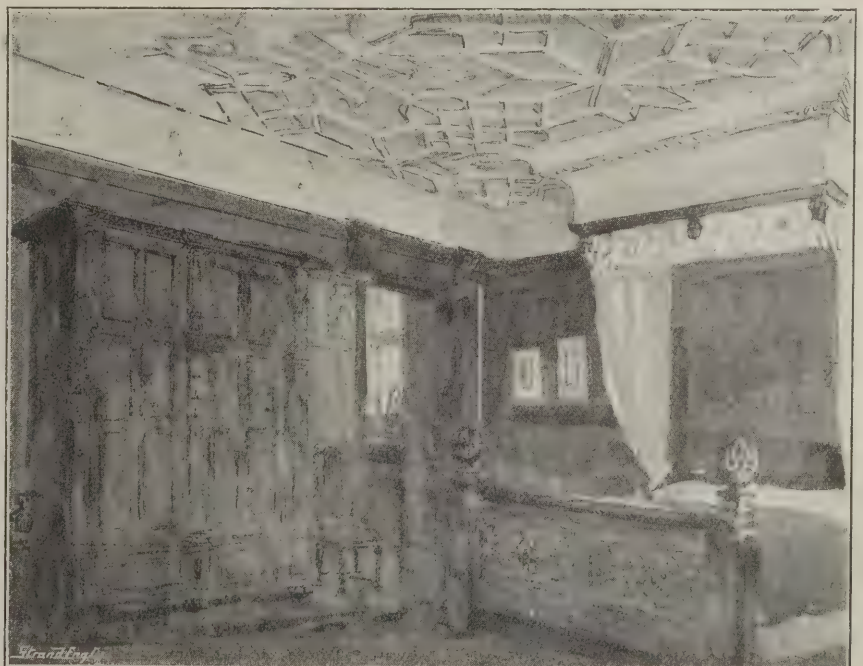
Deliveries to Craft.

Deliveries direct from ship to craft for the first eight months of the year were:—

Deals and battens - 74,435 P.s.h.	75,364	73,391
Boards - 13,565 do.	16,191	16,865

And for August:—

Deals and battens - 13,961 P.s.h.	20,154	22,612
Boards - 2,597 do.	2,585	2,697



THE MANSION HOUSE OF ROSEHAUGH, ROSS-SHIRE, N.B.: JACOBAN BEDROOM.

Soft Woods.

Messrs. Churchill & Sim state that fresh arrivals from Sweden during August had been on a most moderate scale. Prices for deals have not changed from those current in July. Battens have weakened, more in sympathy with an increase in the importation of small sizes from Finland than on their own account. Prepared boards, being in good demand and in light supply, have hardened perhaps 3d. per square since July.

The importation of prepared boards in August from the Norwegian ports has not been half that of August of last year. The demand has been good, and prices are a point up from those submitted in July.

From Russia the new supply for the month has been moderate, only in battens showing some excess over that of August of last year. Some very low landed prices have been accepted for deals during the month, and the sellers are rather aghast at them. They must, however, remember that if they send here low-class deals and planks, which are

not wanted, many of them very much shaken from overkeeping and not in handsome condition, the deduction from the prices obtainable, with difficulty, for picked specifications of contract quality is sure to be serious.

A double supply of Finnish battens in August as compared with August of last year has depressed the market. These small-sized battens have held their own with little variation all through the bad times, the demand running on them so greatly that no increase of supply has been too much for it. The August rate of demand is much more likely to continue through the autumn than the August rate of supply, so this dip in prices is probably temporary.

From Prussia there has been practically no fresh arrival of fir timber during August, and the stock is reducing slowly again, but the demand is very slack and prices are lower than they were in July. Oak timber has brightened up very much in this market during the month. Some increase in demand

has been met by an absolute scarcity in Prussia; the dock stock here has been freely drawn upon and prices have run up rather quickly.

From Canada an importation in August of about one-third of the quantity of pine deals imported in August last year has done but little to help the market in London, which is still in the grip of the reaction from the inflated prices recently current; an inflation which went far to kill the trade here and secure the permanent substitution of other woods. The dock stock is reducing, however, and prices are perhaps a turn firmer than they were in July. There has been a free demand for spruce during the month, which has been met chiefly from the Lower Ports, the St. Lawrence supply being small and dear. In elm and ash there has been little change. Yellow pine timber, in absence of supplies, has improved in a retail way. The importation of sawn pitch-pine timber has been on a moderate scale during August, and has been fairly counterbalanced by the demand, leaving the dock stock under that of last year and market prices perhaps a couple of shillings per load higher than they were in July. There has only been a nominal arrival of planks during the month, but the stock is more than ample for the requirements of a poor market, and prices are on the downward grade.

Hardwoods.

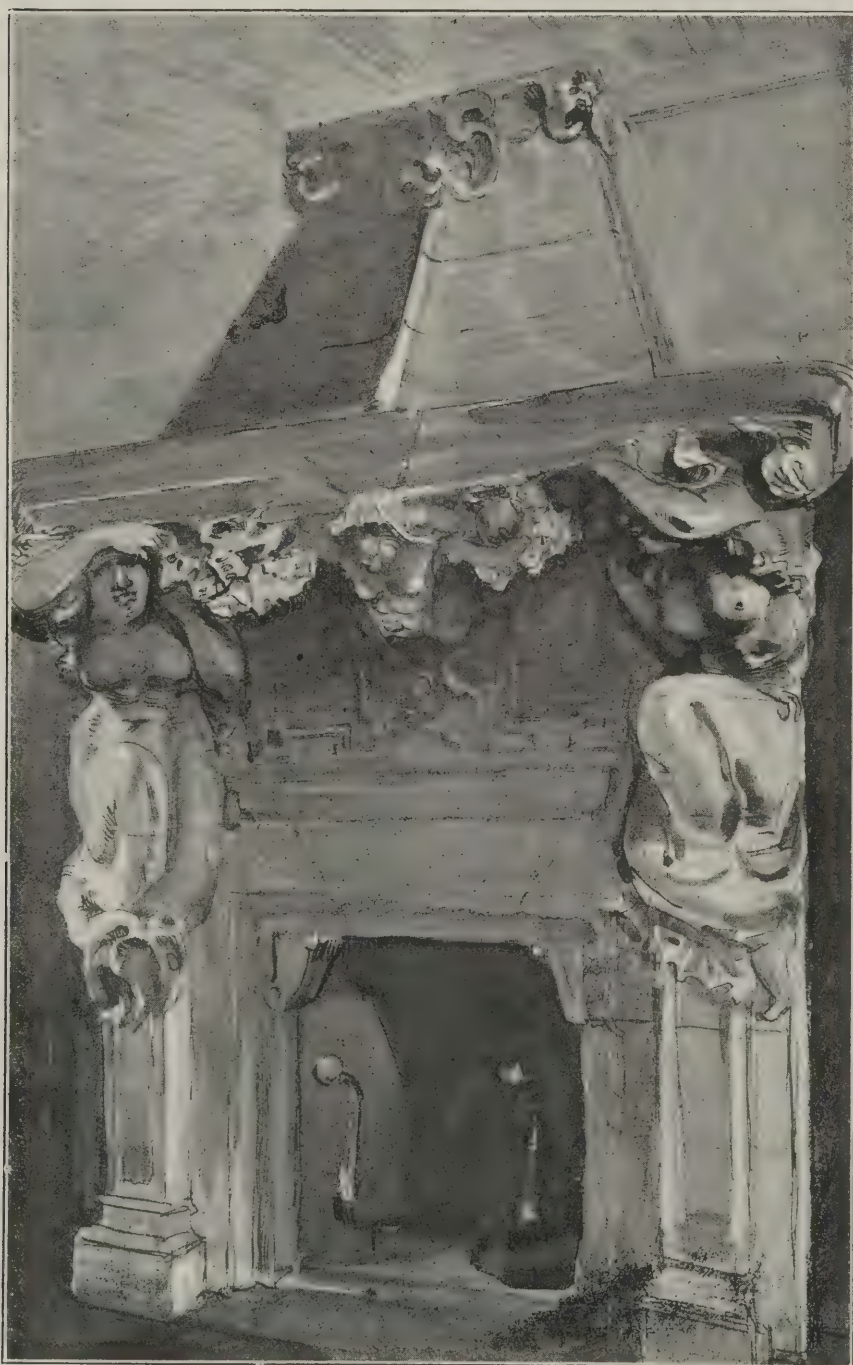
TEAK.—Messrs. Denny, Mott & Dickson report that shippers maintain their attitude of discouraging any chance of forward contracts, by not only quoting higher rates but refusing to make commitments of any importance. There is an expectation that not only our own but Continental admiralities will require sufficient quantities of teak to exhaust the reduced new season's output from the Indian forests, which output can only yield a small proportion of first-class European logs, and these cannot be ready for shipment before next year. The consumption, however, continues to be so restricted that the holders of stocks on this side will wait until they are much nearer the necessity of replacement than at present before they get anxious about next year's supplies. Messrs. C. Leary & Co. report that the demand for planks is dull, though there has been no further drop in prices.

MAHOGANY.—Messrs. C. Leary & Co. report that there is a little more animation in the tone of the market; while some classes of mahogany show no improvement, in other instances higher prices have been realized. Messrs. Denny, Mott & Dickson, Ltd., state that the market is well able to carry the present stocks, Cuba wood being the only weak spot in this vital respect, and that the tone in respect to the prospects of improved consumption is perhaps somewhat more hopeful, although there has not been enough practical encouragement as yet to give any assurance as to a near widening out of business.

OAK.—Odessa oak continues to find a widening market, and the demand serves to show that carefully-selected shipments of a high-class wood can not only find a footing by displacing higher-priced wood for constructive and ornamental purposes, but create a distinct market for itself at reasonably remunerative prices to careful shippers. Canadian oak has rather improved its position in the month. The demand for American quartered oak is poor and prices weak; prime quality boards are in fair demand, but not so logs, planks and inferior boards.

BIRCH.—Canadian birch is holding its own well, the importation having been comparatively small.

AMERICAN WHITEWOOD.—Logs are only saleable if large and prime; for planks and boards prices continue weak, as shipments have been too heavy.



THE MANSION HOUSE OF ROSEHAUGH, ROSS-SHIRE: SMOKING-ROOM FIREPLACE IN TOWER.

PORTLAND CEMENT.

Its Constitution from a Physico-Chemical Standpoint.—I.

By CLIFFORD RICHARDSON.

WE print below the first portion of a paper read before the American Association of Portland Cement Manufacturers by Mr. Clifford Richardson, Director of the New York Testing Laboratory. We shall conclude this in our next issue, but it is advisable to state its general conclusions at once. It is no exaggeration to say that this paper is probably the most important contribution that has yet been made to an exact knowledge of the constitution of Portland cement. It destroys effectually the old theory of silico-aluminates substituting the simple theory of solid solutions, which has already had such an important bearing on the chemistry of steel. In Mr. Richardson's view Portland cement consists of solid solutions of aluminates in silicates. This hypothesis is suggestive. It points, for instance, that in cement as in steel the rate of cooling of the clinker has a very marked effect on its properties, and it seems highly probable that the relations between low, medium and high steels will be found duplicated in low, medium and hard clinkers. The fact of solid diffusion shows that the grinding of the raw materials probably has an economical aspect that has not been appreciated previously. The conversion of the mixed ingredients into clinkers is shown to take place at a temperature below the fusing point, and the stability of the solution depends not only on the composition, but also upon the completeness of the diffusion, which latter depends very largely on the size of the particles of raw material and the temperature. The greater the proportion of lime in the raw materials, the higher the temperature to produce the diffusion in combination with silica. The finer the grinding the greater the proportion of lime that can be carried, or with the same materials, the smaller amount of fuel needed.

The paper is as follows:—

A vast amount of time and energy has been devoted to attempts to elucidate the constitution of Portland cement, but with little success. The conclusions arrived at have been based, as a rule, on little more than theory. The determination by Le Chatelier and Törnebohm, with the aid of the microscope and petrographic methods, of the optical characteristics of the mineralogical entities which constitute a Portland-cement clinker, the work of Le Chatelier and of the Newberrys in preparing synthetically the silicates and aluminates which might possibly exist in the clinker, and of the Newberrys in the preparation of clinker in molecular proportions from pure chemicals, are noteworthy exceptions, and their results, confirmed in several instances by others, are of great value.

Microscopic Study of Clinker.

For the study of clinker by microscopic methods it is necessary to prepare sections which shall be so thin as to be transparent. This is readily done by grinding down a suitable fragment on one side until it is flat, polishing this, then mounting it with balsam on a piece of glass and grinding down the other side of the fragment until a thickness is reached which permits the transmission of light. The section thus prepared is mounted under a cover glass and is ready for observation.

Optical Properties.

It is a peculiarity of minerals of crystalline structure that they vary in their optical properties according to the system in which they crystallize, and especially in regard to their behaviour towards polarized light. It will be impossible here to go in detail into

an explanation of the phenomenon, but it is sufficient to say that different minerals can be differentiated and recognized by their greater or smaller optical activity. The methods are the same as those which are used by geologists and petrographers in the study of crystalline rocks.

By this method of study Le Chatelier, and, at the same time independently of him, Törnebohm identified in Portland-cement clinker four distinct mineral constituents, which Törnebohm described as follows, naming them Alit, Belit, Celit and Felit.

Alit.

Alit is the preponderating element, and consists of colourless crystals of rather strong refractive power, but of weak double refraction. By this he means that alit in polarized light between crossed nicol prisms has insufficient optical activity to produce more than weak bluish grey interference colours.

Belit.

Belit is recognized by its dirty green and somewhat muddy colour and by its brilliant interference colours. It is bi-axial and of high index of refraction. It forms small round grains of no recognized crystalline character.

Celit.

Celit is recognized by its deep colour, brownish orange. It fills the interstices between the other constituents, being the magma or liquid of lowest freezing point out of which the alit is separated. It is strongly double refractive, that is to say, gives brilliant colours when examined between crossed nicol prisms.

Felit.

Felit is colourless. Its index of refraction is nearly the same as that of belit and it is strongly doubly refractive. It occurs in the form of round grains, often in elongated form, but without crystalline outline. Felit may be entirely wanting.

Besides these minerals an amorphous isotropic mass was detected by Törnebohm and Le Chatelier. It is called isotropic because it has no effect upon polarized light. It has a very high refractive index.

Törnebohm adds the important fact that a cement 4 per cent. richer in lime than usual consists almost entirely of alit and celit.

Synthetic Preparation of Silicates and Aluminates.

The preparation of synthetic silicates and aluminates which might exist in Portland cement was carried out to a certain extent by Le Chatelier and the Newberrys, but in neither case were they characterized completely, especially as to their optical properties. This has been done by the writer within the last two years, and the optical properties and other characteristics of the following definite silicates and aluminates have been determined.

Silicates.

Mono-calcic silicate— SiO_2CaO : A crystalline substance of high optical activity and little or no hydraulic properties. Specific gravity 2.90.

Di-calcic silicate— SiO_2CaO , or more probably $2\text{SiO}_2\text{CaO}$: A definite crystalline compound of high optical activity and of very little hydraulic activity except in the presence of carbonic acid, but setting slowly in water, generally lacking volume constancy. Specific gravity 3.29.

Tri-calcic silicate— SiO_2CaO : A definite crystalline silicate of low optical activity and corresponding in this respect with alit. Its hydraulic activity is not great, but greater than that of di-calcic silicate. If fused and reground it sets slowly like Portland cement. Specific gravity 3.03.

Three definite silicates of calcium, therefore, appear to exist, the two more basic ones being strongly differentiated from each other by their optical activity.

Aluminates.

Mono-calcic aluminate— $\text{Al}_2\text{O}_3\text{CaO}$: This aluminate is a crystalline substance of high optical activity, but it is not sufficiently basic to permit of its existence in a material of such basic character as Portland-cement clinker. Specific gravity 2.90.

Tri-calcic di-aluminate— $2\text{Al}_2\text{O}_3\text{CaO}$: This aluminate is one of highly crystalline character and of great optical activity, making it readily recognizable. Specific gravity 2.92.

Di-calcic aluminate— $\text{Al}_2\text{O}_3\text{CaO}$: A substance crystallizing from a state of fusion in dendritic forms having no optical activity, and being, therefore, isotropic. This differentiates this aluminate very sharply from the preceding one and makes the identification of the two materials very easy. Specific gravity 2.79.

Tri-calcic aluminate— $\text{Al}_2\text{O}_3\text{CaO}$: This aluminate crystallizes from the fused condition in elongated octahedra. It is isotropic, and it might at first be assumed that it was not a definite compound, but merely the di-calcic aluminate crystallizing out of a magma of indefinite composition. It has been shown, however, by further investigations too lengthy to go into at this point to be undoubtedly a definite aluminate. Specific gravity 2.91.

Other Compounds.

Definite compounds of iron and lime and alumina and magnesia have also been shown to exist, but their consideration here is unnecessary, as the constitution of Portland cement can be better discussed, theoretically, by a study of clinker into which these elements do not enter.

Erroneous Theories about Silico-Aluminates.

Among the theories advanced as to the constitution of Portland cement there are those which assume the presence of certain so-called silico-aluminates, such as $2\text{SiO}_2\text{Al}_2\text{O}_3\text{CaO}$ and others of less basic form. All of these proposed compounds have been prepared by the writer and found not to be definite chemical compounds, nor to correspond in any way with any of the mineral entities found in industrial clinker. They are in fact only solid solutions, of aluminates in silicates, of indefinite structure.

This brings us to the point where the nature of a solution, especially of solid solutions, must be taken up.

Solutions.

Solutions may be defined as the merging of two or more substances in one another in such a way that it is impossible to recognize them by any physical means. In this respect they differ from the elements and definite chemical compounds. The elements cannot be or have not been differentiated by any chemical or physical means into other substances. Definite chemical compounds can be differentiated by chemical means into their constituent elements, but at the same time are always composed of these elements in a definite mathematical ratio, involving only whole numbers and depending upon the combining weight of each element.

Solid Solutions.

Mixtures of gases, gases dissolved in liquids, liquids which are mixed together and salts dissolved in liquids, are types of solutions. In the preceding paragraph mention has been made of solid solutions. We owe our conception of such solutions to Van't Hoff, a Dutch chemist, who, in 1890, having observed some abnormal features in the behaviour of certain solutions of solids in liquids when they were frozen, was led to believe that the solid which separates on freezing is not the pure solvent, but a mixture of the solid solvent and the dissolved substance forming a solid solution. Investigations have proved that the conception

was justified. Roozeboom has shown from a study of mixtures of fused salts that on cooling solid solutions are often formed, especially if the salts have the same crystalline form and habit.

Rocks as Solutions.

The constitution of our igneous rocks may best be explained by considering them as solid solutions, which, when the original liquid magma, from which they are derived, is cooled to a temperature at which freezing sets in, are formed by the crystallization of such mineral species as the constitution of the magma may permit, and which we recognize as quartz, mica, feldspar, &c., the composition of which, while in approximately definite proportions, is more or less modified by the substances which they may retain in solution.

Alloys as Solutions.

The structure of alloys has also been most satisfactorily explained by considering that different metals are soluble in each other in different proportions under different states of concentration and at different temperatures; that of steel has been especially thoroughly worked out in the same way, and it has been shown that it consists of a solid solution of carbon in pure iron, while that of cast-iron is explained by the fact that the amount of carbon soluble in the molten iron is so great that a portion separates out, as graphite, on cooling.

Glass a Solution.

Another type of solid solution is glass. In this material we have a solid solution of silica, lime and alkalis, in indefinite proportions, in which none of the constituents can be detected, and out of which nothing separates on freezing. This is regarded as a homogeneous solid solution, and corresponds closely to a homogeneous liquid solution.

Selective Freezing.

In some mixtures of fused salts and in some of the alloys we have heterogeneous solid solutions, as more than one solid solution may separate on freezing. Such a separation is due to what is known as selective freezing. This is well illustrated by the freezing of a solution of salt in water. That portion of the solvent which becomes solid first contains less salt than anything subsequently separated. If we take a 15 per cent. solution of salt in water as an example, as has been done by Howe in his excellent book entitled "Iron, Steel and other Alloys," to which the reader is referred for an exhaustive explanation of the theory of solid solutions, and to which the writer is much indebted, it will be found that the solid matter that first freezes out is nearly pure water, and that there is a corresponding increase in the concentration of the mother liquor. The solid which subsequently separates will contain progressively more and more salt in solid solution in the ice, and there will be a progressive fall in the freezing point of this liquid, until when the temperature has reached minus 22° C. and the proportions of salt in the mother liquor is 23.6 per cent., further concentration will not occur, and the two elements, water and salt, solidify without selection and form what is called a eutectic. The freezing point remains constant at 22 degs. C. until the entire material is solid. The solid originating in this way is a mixed mass of crystals of water and of salt inter-stratified, the salt forming 23.6 per cent. of it and ice 76.4 per cent. The same result would happen with a 20 per cent. solution of salt, the selective freezing going on until the concentration of 23.6 per cent. had been obtained and the eutectic ratio had been reached. If the original solution contained 23.6 per cent. of salt it would not freeze until a temperature of minus 22 degs. C. had been reached, and then it would all become one uniformly mixed

mass of the solid known as the eutectic. If the percentage of salt is greater than the eutectic ratio, 23.6 per cent., then the material which first freezes will be salt containing some water in solution, and the concentration in relation to salt would be reduced until the eutectic ratio is reached. That is to say, the composition of the eutectic is constant no matter what the initial ratio is between the solvent and that which it dissolves.

Alloys.

Again, many alloys are quite parallel in their constitution to that of the solid salt-water series. Tin and lead form a eutectic constituting 31 per cent. of tin and 69 per cent. of lead of constant freezing-point. Any tin-lead alloy of other than the eutectic proportion will consist of lead with tin in solution and the eutectic, or tin with some lead in solution and the eutectic, in accordance with whether the lead or tin are in excess over the eutectic ratio.

In some cases however where metals or salts are not mutually soluble in the solid state, unselective freezing may take place, that is to say, the elements of the fused solution may solidify separately, and this may be regarded as a eutectiferous mixture.

The Term Eutectic.

The term eutectic means well melting, because the eutectic is usually the material which freezes out at the lowest temperature, no matter what the proportions may be of which the mixture may happen to consist.

Isomorphous Mixtures or Mixed Crystals.

Two salts which crystallize in the same form may separate from aqueous solutions in such a crystalline form containing more or less of both substances, depending upon the concentration, and in the same way a crystal consisting entirely of one salt may be built up with another by immersing it in a solution of a so-called isomorphous salt of proper concentration, that is to say, of a salt which crystallizes in the same form. These crystals are known as isomorphous mixtures or mixed crystals.

Isodimorphous Mixture or Solid Solution.

Exceptionally a substance which crystallizes in a different form from another may assume the form of the latter and crystallize with it as a so-called isodimorphous mixture or solid solution. The salt which has changed its form must, of course, be under a certain tension in such a solution. Such a state of affairs will be found to be the case in a Portland-cement clinker, and an example of such an isodimorphous mixture among simple well-known salts will be instructive. The orthorhombic sulphate of magnesia, $MgSO_4 \cdot 7H_2O$, for instance, can take up and hold in solution in the form of orthorhombic crystals as much as 18.78 per cent. of the monoclinic ferrous sulphate, $Fe_2SO_4 \cdot 7H_2O$, while the iron salt can take up 46.00 per cent. of the magnesia sulphate and hold it in solution in the monoclinic form. Between these limits we find both forms of solid solutions or crystals present. The relation of the isotropic aluminates of lime to the anisotropic silicates will be found to be, in Portland-cement clinker, similar to that which has been described.

Emulsions in Portland Cement.

The relation of materials to each other which are not soluble or miscible with each other in all proportions may be also illustrated by mixtures of ether and water. In such mixtures, if they are shaken and the amount of ether present is not greater than what the water can dissolve, a homogeneous solution is formed. As soon as the proportion of ether reaches a point where it will not dissolve on shaking an emulsion will form, and this will continue to be the case with the increase in the proportion of ether until the latter reaches an amount where it can

dissolve the water present. If it were possible to cool ether-water mixtures so rapidly as to solidify them at once we should find, for certain concentrations where the ether was only slightly in excess of what could dissolve, a solid solution of water and ether and an emulsion of water and ether corresponding in structure to a eutectic, but here the eutectic would not consist of separate particles of ether and of water, but of separate particles of ether saturated with water and water saturated with ether. This is a structure which will be met with in Portland-cement clinker. Whether it is a eutectic or not is unimportant. It is the structure itself which is illustrative of what takes place when the components of the mixture are not soluble in each other in all proportions. In Portland-cement clinker of certain concentrations similar emulsions are found.

Steel a Solution.

It will be of interest here to consider a solution which bears some parallel to those which we are about to consider in Portland cement. Steel is a solution of carbon in pure iron. Carbon dissolves in the molten iron to a very considerable extent and remains in solution as long as the metal is molten. If cooling and freezing takes place, the structure of the solid metal will be found to depend upon the proportion of carbon which was dissolved in the original iron and the temperature at which it was cooled. If carbon amounts to but a few hundredths of 1 per cent. the solid metal will be wrought-iron; if it does not exceed that amount which will remain in solution in iron after cooling it is steel; if the carbon is greater than this some of it will separate as graphite, and the solid metal will be cast-iron.

Structure determined by Microscope.

The structure of the metal in the solid state under these different conditions may be determined with the microscope, but, of course, not in thin sections as in the case of clinker, but by the examination of polished surfaces which have been etched in some appropriate way. The study of iron and steel by these methods has been carried out most elaborately, and books published on the subject. The writer has already referred to one by Prof. H. M. Howe, of Columbia University, entitled "Iron, Steel and other Alloys," in which the metallography of steel is considered and discussed at length.

It will only be necessary to state here in a general way that when molten iron containing carbon in solution, in amount insufficient to cause a separation of graphite on cooling, is rapidly cooled from a very high temperature, the solid metal will be found to have definite properties, depending on the percentage of carbon present, the lower percentages furnishing mild steel, the higher tool steel, with a structure which is so definite that it has been named austenite. It will be also found that when the steel in this condition is reheated, as in tempering, the austenite structure is lost, the metal being transformed into a material of quite a different structure, with resulting changes in its physical properties.

Portland Cement parallel to Steel.

The possibility that Portland cement might be, in a parallel way to steel, a solution of some aluminate in a tri-calcic silicate was evident in the early stages of the writer's investigations, and the problem at once became the solution of the questions, what is alit and what is celit, the two essential constituents of a clinker. If they are solid solutions, what are the components of each, and is their structure changed like that of steel at a definite temperature?

Preparation of Clinkers.

The problem was approached in the following manner:—Clinkers were made from pure chemicals, silica, alumina and lime, in the proportions found in industrial clinker.

In order to obtain these proportions it was necessary to determine what were the molecular ratios between silica, alumina and its chemical equivalent, iron oxide, and lime and its chemical equivalents, the magnesia and alkalies. Fortunately, there are in existence two very exact analyses of industrial clinker which will serve for the purpose. If, in these analyses, the weight per cent. of each constituent is divided by the molecular weight of this constituent—that is to say, by its combining number—the quotient will give the relative number of molecules of the different substances in the clinker. It is also possible by adding the molecular proportions of alumina and iron together, and of all the bases together, to discover the relation of silica, alumina and iron oxides, these being known as R_2O_3 bases, but here acting as acids, and the lime and other bases, known as the MO bases, to each other, and by dividing each of these ratios by such a figure as will make that for silica equal to 100 to express this still more simply. It is also possible from these ratios to calculate, by multiplying them by the atomic weight of silica, alumina and lime, the proportions by weight and the percentages of each of these materials which it is necessary to use in order to produce a pure clinker having the same basicity and molecular ratio as the industrial clinker, but in which the unessential elements are absent. In this process, however, it is necessary to deduct the amount of lime which is present in combination with sulphuric acid, as this plays no part in the formation of the clinker.

Analyses of Cements.

No. 1.	Per cent.	Molecular ratio.
Silica - - - - -	21.66	3.86
Alumina - - - - -	7.01	0.686
Iron oxide - - - - -	2.57	0.167
Lime - - - - -	63.95	1.1400
Lime—minus SO_3 equiv.		1.1230
Magnesia - - - - -	2.69	0.666
Potash - - - - -	.51	0.55
Soda - - - - -	.25	0.040
Sulphuric acid - - - - -	1.36	0.0170

Alumina + iron oxide = R_2O_3 .
Lime + sulphuric acid + magnesia, potash and soda = MO.
MO for R_2O_3 after deducting 3MO for SiO_2 = .344 for 238 R_2O_3 .

No. 2.	Per cent.	Molecular ratio.
Silica - - - - -	21.64	3.748
Alumina - - - - -	6.18	0.604
Iron oxide - - - - -	2.41	0.151
Lime - - - - -	64.89	1.1531
Lime—minus SO_3 equiv.		1.1305
Magnesia - - - - -	1.13	0.279
Potash - - - - -	.63	0.067
Soda - - - - -	.30	0.048
Sulphuric acid - - - - -	1.81	0.0226

MO for R_2O_3 after deducting 3MO for SiO_2 = .121 for 201 R_2O_3 .

Composition of Pure Clinker.

	1.	2.
	Per cent.	Per cent.
Silica - - - - -	21.2	23.6
Alumina - - - - -	8.9	8.0
Lime - - - - -	63.9	68.4

Molecular Ratios.

The molecular ratios for the two cements which have been mentioned appear in the accompanying tables, together with the percentage composition of the pure clinkers which were made in these proportions, calculating the R_2O_3 bases as alumina and all the remaining bases as lime.

Composition of No. 1 Cement.

It appears from the above ratios that in cement No. 1, after deducting 3 molecules of lime for combination with silica as tri-calcic silicate, but .344 of a molecule is left for combination with .238 of alumina in the form of an aluminate. This corresponds very closely to the ratio demanded by $2Al_2O_3 \cdot 3CaO$ and to the molecular formula $42(SiO_2 \cdot 3CaO) \cdot 5(2Al_2O_3 \cdot 3CaO)$, a molecular ratio of 23.8 aluminate to 100 of tri-calcic silicate. This might be assumed to exist as a solution of such an aluminate in such proportions in tri-calcic silicate.

Composition of No. 2 Cement.

In cement No. 2 after the same deduction enough lime is not left to form even a mono-calcic salt with the alumina. This necessitates the conclusion that some di-calcic silicate must be present, and on this basis the formula for the pure clinker may be written, $18(SiO_2 \cdot 3CaO) + 7(SiO_2 \cdot 2CaO) + 5(Al_2O_3 \cdot 2CaO)$.

Appearance of Thin Sections.

Thin sections of clinkers of the composition which has been given were prepared. It was found on examination with polarized light that clinker No. 1 contained both alit and celit, that is to say, it was not a homogeneous solution of the aluminate, $2R_2O_3 \cdot 3CaO$, in tri-calcic silicate. In the pure clinker No. 2 the same structure was found, but a larger proportion of celit was present.

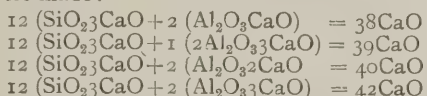
Special Clinkers Prepared.

This state of affairs opened up a new field of enquiry as to what would be the structure of clinkers in which tri-calcic silicate and

Series 6 Silicate 1 Aluminate.

	(R_2O_3)	SiO_2	Al_2O_3	CaO
12 ($SiO_2 \cdot 3CaO$) + 2 ($Al_2O_3 \cdot 3CaO$)	33	23.7	6.7	69.6
12 ($SiO_2 \cdot 3CaO$) + 1 ($2Al_2O_3 \cdot 3CaO$)	39	23.2	6.6	70.2
12 ($SiO_2 \cdot 3CaO$) + 2 ($Al_2O_3 \cdot 2CaO$)	40	22.8	6.4	70.8
12 ($SiO_2 \cdot 3CaO$) + 2 ($Al_2O_3 \cdot 3CaO$)	42	21.1	6.2	71.7
Extreme difference in composition =		1.6	.5	2.1
Alit.	9 ($SiO_2 \cdot 3CaO$)	($Al_2O_3 \cdot 3CaO$)	+ 3 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)
10 ($SiO_2 \cdot 3CaO$)	($Al_2O_3 \cdot 3CaO$)	+ 2 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)	23.9 per cent.
11 ($SiO_2 \cdot 3CaO$)	($Al_2O_3 \cdot 3CaO$)	+ 1 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)	17.2 per cent.
12 ($SiO_2 \cdot 3CaO$)	($Al_2O_3 \cdot 3CaO$)			12.0 per cent.

the various aluminates were present in a certain definite molecular ratio. The ratio 6 to 1 was chosen, it being well within the limit of what might occur in an industrial Portland cement, and the following clinkers were made:—



Thin sections of these clinkers showed that the one corresponding to the substance present as mono-calcic aluminate contained a very considerable amount of celit; that corresponding to the next higher degree of basicity, $2Al_2O_3 \cdot 3CaO$, contained less; that corresponding to $Al_2O_3 \cdot 2CaO$ still less; while that in which tri-calcic aluminate, $Al_2O_3 \cdot 3CaO$, is supposed to be the form in

Series 3 Silicate 1 Aluminate, or, 6 Silicate 2 Aluminate.

	SiO_2	Al_2O_3	CaO
6 ($SiO_2 \cdot 3CaO$) + 2 ($Al_2O_3 \cdot 3CaO$)	21.5	12.1	66.4
6 ($SiO_2 \cdot 3CaO$) + 1 ($2Al_2O_3 \cdot 3CaO$)	20.8	11.6	67.6
6 ($SiO_2 \cdot 3CaO$) + 2 ($Al_2O_3 \cdot 2CaO$)	20.1	11.4	68.5
6 ($SiO_2 \cdot 3CaO$) + 2 ($Al_2O_3 \cdot 3CaO$)	18.9	10.7	70.4
Extreme difference in composition =	2.6	1.4	4.0

	Alit.	Celit.	Celit.
3 ($SiO_2 \cdot 3CaO$)	($Al_2O_3 \cdot 3CaO$)	+ 3 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)
4 ($SiO_2 \cdot 3CaO$)	($Al_2O_3 \cdot 3CaO$)	+ 2 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)
5 ($SiO_2 \cdot 3CaO$)	($Al_2O_3 \cdot 3CaO$)	+ 1 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)
6 ($SiO_2 \cdot 3CaO$)	2($Al_2O_3 \cdot 3CaO$)	All Alit	
Extreme difference in composition between two sets = 6 to 1 and 3 to 1		4.8	5.9

Series 4 Silicate 1 Aluminate.

	Basicity of $Al_2O_3 \cdot 3CaO$				<i>Celit.</i>
5 ($SiO_2 \cdot 3CaO$)	$(Al_2O_3 \cdot 3CaO)$	+ 3	$(SiO_2 \cdot 2CaO)$	$(Al_2O_3 \cdot 2CaO)$	34.1 per cent.
6 ($SiO_2 \cdot 3CaO$)	Basicity of $Al_2O_3 \cdot 2CaO$				
	$(Al_2O_3 \cdot 3CaO)$	+ 2	$(SiO_2 \cdot 2CaO)$	$(Al_2O_3 \cdot 2CaO)$	24.7 "
7 ($SiO_2 \cdot 3CaO$)	Basicity of $Al_2O_3 \cdot 3CaO$				
	$(Al_2O_3 \cdot 3CaO)$	+ 1	$(SiO_2 \cdot 2CaO)$	$(Al_2O_3 \cdot 2CaO)$	17.1 "

Series 5 Silicate 1 Aluminate.

	Basicity of $Al_2O_3 \cdot 3CaO$ ($Al_2O_3 \cdot 3CaO$)	+ 3 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)	Celit.
7 ($SiO_2 \cdot 3CaO$)	Basicity of $Al_2O_3 \cdot 2CaO$			28.1 per cent.
8 ($SiO_2 \cdot 3CaO$)	Basicity of $Al_2O_3 \cdot 3CaO$	+ 2 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)	21.0 "
9 ($SiO_2 \cdot 3CaO$)	Basicity of $Al_2O_3 \cdot 3CaO$	+ 1 ($SiO_2 \cdot 2CaO$)	($Al_2O_3 \cdot 2CaO$)	14.2 "

which the aluminate is present contains no celit, but is a pure alit corresponding in every way with that seen in industrial Portland-cement clinker.

Composition of Alit.

The composition of alit is, in this way, entirely satisfactorily explained. It is a solid solution of tri-calcic aluminate in tri-calcic silicate. And on reflection it is readily seen that the di-calcic aluminate could not become dissolved in tri-calcic

silicate without reaction going on and interchange of base between the tri-calcic silicate and di-calcic aluminate to such an extent as to convert a portion of the di-calcic aluminate to the tri-calcic form and a corresponding portion of the tri-calcic silicate to the di-calcic form. The tri-calcic aluminate then dissolves in the tri-calcic silicate and the di-calcic aluminate in the di-calcic silicate, thus forming two separate and distinct solid solutions, the one alit and the other celit, which, while no doubt miscible in the molten condition, are not so in the solid form. In the same way the interchange of bases in the clinkers of less basic form where the amount of lime was only sufficient to account for the presence of mono-calcic or tri-calcic di-aluminate, would result in a similar state of affairs, but with a much larger percentage of celit as the basicity decreases.

Formula for Clinkers.

The formula for these clinkers and the calculated amount of celit which they should contain would be as follows:—

These experiments, therefore, explain thoroughly the constitution of a pure Portland-cement clinker. The presence of unessential elements such as iron, magnesia and the alkalies will produce an effect which does not affect the facts essentially; it may merely provide for the presence of some other more complicated solid solutions, although this seems improbable, since the unessentials in an industrial clinker are apparently in solution in the celit, and although the presence of felit may be, perhaps, attributed to them.

In the same way as above the relative proportion of alit and celit can be calculated for a series in which the relation of silicate to aluminate is as 3 to 1, 4 to 1 and 5 to 1, and these wide ranges will cover all that will occur in industrial clinker.

The relative Proportions of Alit and Celit.

It is evident that the relative proportions of alit and celit are dependent upon two variables, on the relation of silicate to aluminate and on the basicity of the clinker taken as a whole. It is also apparent that the ratio of 3 to 1 is an extreme limit in one direction, but that that of 6 to 1 in the other is not an extreme if industrial conditions could be accommodated to the production of such

a clinker. It is also of interest to note that in the series 6 to 1 the extreme difference in composition between the different clinkers is so small—but 1·6 for silica, 0·5 for alumina and 2·1 per cent. for lime. In the series 3 to 1 the extremes are much larger and the differences 2·6 for silica, 1·4 for alumina and 4·0 per cent. for lime. This points to the fact that the regulation of the percentage of the various constituents in a clinker containing a large amount of alumina requires much more care than in one low in alumina. Between the two extreme series the greatest differences in composition are 4·8 for silica, 5·9 for alumina and 5·3 per cent. for lime. From this it may be calculated that the extremes of composition of an industrial Portland cement within the bounds of the above ratios, if the cement is perfectly burned, would be:—

Silica	-	-	-	-	18·5—23·2
Alumina (R_2O_3)	-	-	-	-	6·1—11·9
Lime (without magnesia or alkalies)	-	-	-	-	63·1—68·1

Composition of Clinkers in Practice.

In practice our industrial clinkers do not reach the highest percentages of lime because the conditions available for their production commercially do not at present permit of it, and as a matter of fact they contain a larger proportion of celit than they would were it possible to do so. This is illustrated by calculating the theoretical percentages of celit in the clinkers prepared from pure chemicals, on the basis of the composition of the two cements which have been referred to.

To the pure clinker which was made to correspond to the cement which we have called No. 1, it was found that the molecular formula $42 (SiO_2 \cdot 3CaO) \cdot 5 (2Al_2O_3 \cdot 3CaO)$ could be assigned. On the alit and celit basis, after equilibrium has been established between the basicity of the silicate and aluminate, this formula might correspond to

36 ($SiO_2 \cdot 2CaO$)	1 ($Al_2O_3 \cdot 3CaO$)	+	10 ($SiO_2 \cdot 2CaO$)	9 ($Al_2O_3 \cdot 2CaO$), or
32 ($SiO_2 \cdot 3CaO$)	5 ($Al_2O_3 \cdot 3CaO$)	+	16 ($SiO_2 \cdot 2CaO$)	5 ($Al_2O_3 \cdot 2CaO$), or
28 ($SiO_2 \cdot 3CaO$)	9 ($Al_2O_3 \cdot 3CaO$)	+	14 ($SiO_2 \cdot 2CaO$)	5 ($Al_2O_3 \cdot 2CaO$).

Influence of Temperature.

The latter form would be improbable as, in that case, the celit would be too infusible, owing to the small percentage of aluminate which it would contain, but in the other two cases the celit would be rich in aluminate, and on that account the cement would be quick setting, which was actually the case before it was plastered.

Which of the above formulas would be applicable here depends in any case, probably, on the rate of cooling of the clinker, and this explains why cooling at different rates may result in cement of very different properties.

An increase in the lime in the case of the cement under consideration, No. 1, would have resulted in an increase in the amount of possible tri-calcic aluminate and consequently of alit, and the cement would be slower setting. This has been found to be the case in clinkers produced in the laboratory, if they were burned at a sufficiently high temperature.

In the same way cement No. 2, to which a formula has previously been assigned, may be regarded as $15(SiO_2 \cdot 3CaO) \cdot 3(Al_2O_3 \cdot 3CaO) + 10(SiO_2 \cdot 2CaO) \cdot 2(Al_2O_3 \cdot 3CaO)$. This clinker contains nearly 1 per cent. less alumina, is a much less concentrated solution of the aluminates in the silicates than is clinker No. 1, but, on the other hand, it is much less basic and contains a larger percentage of the dilute celit, 30·8 per cent. as compared to 24·4 per cent. For the first reason the cement made from the No. 1 clinker should be slower setting than that made from the No. 2 clinker, but for the second the cement from the latter clinker should be less volume-constant, since celit, being a di-calcic silicate solution, possesses the characteristics lack of volume constancy of that component.

(To be concluded.)

Builders' Notes.

The National Schools, Stapleford, Notts. have just been supplied by Messrs. E. H. Shorland & Brother, of Manchester, with their patent Manchester grates.

The Eastbourne Building Trade is expected to be very quiet next year, judging by the number of plans submitted to the Town Council.

Wicker Congregational Church, Sheffield.—The new hot-water heating apparatus for this church has been installed by Messrs. Stanley, Sheen & Co., heating engineers, Sheffield, on their small-pipe safety system.

Stockport's new Town Hall: Change of Contractors.—Mr. William Pownall, whose tender of £54,496 for the erection of a new town hall at Stockport was recently accepted by the Corporation, has declined to enter into the contract, and the work has been undertaken by Mr. Josiah Briggs, of Heaton Norris, at £56,881. Mr. Brumwell Thomas is the architect.

Stones.—Messrs. J. Hodson & Son, Ltd., the well-known general stone merchants, of Nottingham, have just supplied a quantity of engine beds, &c., in best Derbyshire stone for the new naval hospital at Chatham. They have now in hand, among others, orders for hard blue York stone required for a new bank at Rhayader, and for St. Bees stone for a library at Neath.

The Peterhead Master Builders' Association held its annual meeting last week, Mr. William Hadden, president, presiding. The accounts for the year showed the finances to be in a very satisfactory condition. The following were elected office-bearers for next year:—President, Mr. John Davidson, plumber; vice-president,

Mr. Alexander Ferguson, painter; secretary and treasurer,

Mr. A. C. Martin, solicitor; committee—Messrs. W. McIntosh, slater; A. Scott, builder; W. Jolly, painter; W. G. Stuart, builder; A. L. Williamson, blacksmith; J. P. Dyce, plumber; and William Shand, plasterer.

House Decorators' Convention.—The eleventh annual convention of the National Association of Master House Painters and Decorators of England and Wales will be held in Manchester next week. An exhibition of manufactures and of apprentices' competition and international studentship competition drawings will be opened in St. James's Hall, Oxford Street. On the evening of the 19th the President of the Association (Councillor James Higson, of Salford) will hold a reception in the hall, to be followed by a concert and a dance. Next morning the inaugural ceremony will be performed in the exhibition by the Lord Mayor of Manchester. Councillor Higson will occupy the chair at its subsequent proceedings, which will take place in the lesser hall during the afternoon and evening of the 20th and the morning and afternoon of the 21st instant. Greetings from kindred associations in Scotland and Ireland will be presented by their respective presidents, Colonel R. J. Bennett and Mr. J. Murphy. Mr. J. D. Crace, President of the Institute of British Decorators, and Mr. R. Glazier, head master of the Manchester Municipal School of Art, will deliver addresses on special subjects. Various papers will be read by others, and the general business of the Convention will be transacted. The annual dinner is fixed for the Wednesday evening at the Midland Hotel; on the 22nd instant there will be an excursion to Chester and Eaton Hall; and on the 23rd visits will be paid to places of interest in and about Manchester.

A Record in Building.—The new Theatre Royal, Birmingham, so far as the actual brickwork is concerned, has been erected, and the old theatre demolished in less than five months.

A Question of Contract.—At the Newcastle-on-Tyne County Court recently an electrician sued a builder for £25, balance of contract price for electrical work done. The defence was that the payment ought to be made by the owner of the building, not by the builder. The judge, however, found that the architect employed the plaintiff as agent of the contractor, and not as agent of the building owner. He found, too, that the contractor had received from the owner of the building the whole of the money to which he was entitled, and that that included the money due to the plaintiff. He gave judgment for the plaintiff with costs.

An Extension to Singer's Sewing Machine Manufactory at Kilbowie has just been completed in six months—a performance of which even such an experienced firm as Messrs. Robert M'Alpine & Sons, the contractors, may well be proud. The building is 800ft. in length, 80ft. in width, with six floors, making a height of 90ft. The foundations required 7,000 tons of concrete, the columns and flooring 4,000 tons of steel and iron work, the fire-excluding casing of these 14,000 tons of ferrolithic, and the flooring 1,500 tons of timber. The area of floors is $1\frac{1}{2}$ acres, and the windows together measure $8\frac{1}{2}$ acres. The great walls of the building at the base are 36ins. thick, reduced to 18ins. at the upper floors. Buttresses are introduced at intervals of 15ft. 4ins., projecting 18ins. from the face, and being 4ft. in width; through some of them are formed flues for exhausting air from the building; there are ninety-six such ventilating shafts. One complete floor—a 15ft. height of brick wall, nearly 2,000ft. long—was completed each month, in addition to the internal walls, columns and flooring. At this period 800 men were employed. The steel work, &c., is proportioned to carry on the floor a load of 300lbs. per sq. ft. Extending across the building and riveted to the columns are the main girders, which are built up of two steel joists, 16ins. deep and 6ins. wide, riveted together, and weighing 62 lbs. per lin. ft. These girders support the longitudinals or floor beams, placed at 3ft. 3 ins. centres. All the steel used was required to withstand an ultimate tensile test of not less than 27 tons, and not more than 32 tons per sq. in., with a minimum elongation of 20 per cent. in 8ins. The ferrolithic with which the steel has been encased constitutes one of the interesting features of the work. Instead of using stone and ordinary sand to mix with the cement to form the concrete, the firm now utilize the slag which is a by-product of the Siemens-Martin and other steel furnaces. Tests made prove that this ferrolithic is of 50 per cent. higher tensile strength than concrete made with equal proportions of granite crushings, all other conditions being equal. The steel slag is also much stronger and gives more consistently successful results than blast-furnace slag. The steel slag is crushed to cubes of $1\frac{1}{2}$ ins. diameter, and the remaining powder is used in preference to ordinary sand. With 4 parts of slag, 1 of such sand, and 1 of Portland cement, a material is made which is not only of great strength, but of close grain, and when formed in shuttering in the usual way serves not only as a casing for columns, joists, &c., but can be made into great slabs, suitable for paving and for the walls of buildings, and as such will displace brick and sandstone. It has the merit of smoothness, so that no plastering will be required, and this will make for cleanliness. Two slabs form a wall, leaving a ventilating space between for dryness.

Construction Notes.

Buildings in the Tropics.

IN tropical countries corrugated iron buildings are almost invariably erected on small cast-iron foundation columns, which raises them from 2ft. to 3ft. above the ground, and thus lessens the chances of catching malarial fever. There are, however, many other things to guard against, the chief of which is the white ant. So destructive is this insect, yet so well does it conceal its operations, that a chair that is to all outward appearance quite sound will break and crumble away on being touched. It would be the same with the woodwork of the buildings were it not that special precautions are taken. The small iron columns which support the buildings are surmounted with inverted cup-shaped caps, which entirely prevent insects and, in fact, all sorts of vermin climbing beyond them. The steps leading up to the building are rendered vermin-proof in one of two ways, namely, by standing the feet in iron pans containing water, or by painting them all round with grease, as in a similar manner the fruit farmers in Kent prevent the female moth climbing their trees.

Ochres.

In the colour trade an ochre, whether yellow, red or brown, is usually defined as a material with a clay base, stained with oxide or hydrated oxide of iron. By the mineralogist, however, the term "ochre" is used to refer to a variety of metallic oxides and other compounds chiefly formed as products of alteration and occurring as incrustations of an earthy nature on the minerals from which they have been derived by the action of the atmosphere. Thus in mineralogy we have antimony ochre, bismuth ochre, nickel ochre and uranium ochre, &c. In estimating the value of an ochre the quantity of oil it absorbs must be taken into account as to its value as a pigment. In Britain ochres are used chiefly

as stainers, but in America quite a large proportion of ochre paint is used as a self-colour.

Painting Wood.

PAINING is not always a good thing for wood in the way of a preservative. Nearly all of the wood used commercially in engineering work is practically green, having no more seasoning than that which handling and shipping incidentally allow. To paint such wood would close up the pores, confining the sap and inducing dry rot, which is the most treacherous form of decay to which it could be subjected. Dry rot is the form of decay that attacks the heart of wood kept in unventilated positions or prevented in any way from drying internally. The fermentation of the sap destroys the fibres of the wood, and turns it into a powder. Painting in general would delay seasoning, which is simply the drying out of the sap. Wood that is thoroughly seasoned, or even kiln-dried wood, in locations where wet rot is apt to attack it, will no doubt have its life prolonged by paint. Wet rot is decay from the surface caused by the occasional or periodical accumulation of water and its slow drying away. It is slow combustion. Two pieces of timber in close contact in out-door work would be subject to this kind of decay. On such surfaces a coat of paint would be useful as a preservative. No further example in proof of the lasting qualities of unpainted wood is needed than the old barns and half-timber houses about the country. It should be noted however that if the wood is to last there should be a circulation of air round the timber, the ends should not be sealed, and the timber protected from strong heat of the sun and from protracted moisture, conditions most favourable to seasoning and consequent long life of wood. The beauty of weathered wood, such as the silvery tone oak acquires with age, makes it very desirable that architects should more often consider the question of leaving wood unpainted.

Strength of Steel and Iron.

The strength of pure iron is probably about 38,000 lbs. to 39,000 lbs. per sq. in. An increase of 0.01 per cent. in carbon raises the tensile strength about 1,210 lbs. in acid and 950 lbs. in basic steel per sq. in. An increase of 0.01 per cent. manganese has very little effect upon acid steel, except when in excess of 0.6 per cent., but in basic steel it raises the strength about 85 lbs. An increase of 0.01 per cent. of phosphorus increases the strength by 890 lbs. in acid and 1,050 lbs. in basic steel. Silicon in low—up to 0.25 per cent.—carbon steel when in small proportions has an unappreciable effect on the tensile strength. Sulphur in ordinary proportions exerts no appreciable influence upon the tensile strength.

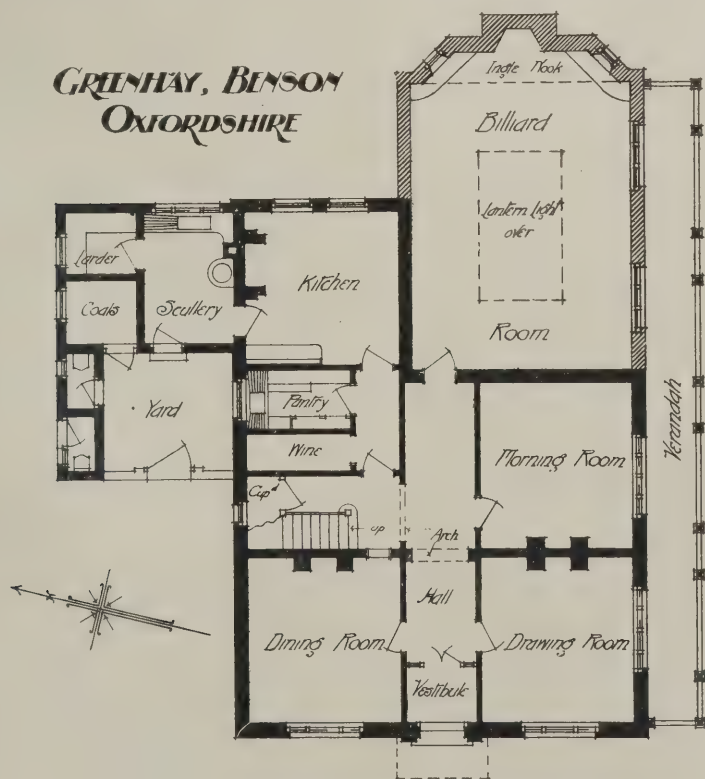
Strength of Glass.

TRANSVERSE breaking tests of plate glass furnished by several different makers have been made at the Watertown Arsenal. The thickness of the glass varied from $\frac{1}{8}$ in. to 1 in. and the span from 8 ins. to 24 ins. The modulus of rupture, which ranged from 2,000 lbs. to 8,000 lbs. per sq. in., was generally greater with the lesser thicknesses. Of the various kinds of glass tested—rough, ribbed, polished and wired—there was little difference in strength except that the wired glass showed a little greater strength than the other kinds. The strength was also greater for the "sandwiched rolled" than for the solid rolled wire glass. The strength of glass set in frames was practically double that of the specimens tested transversely.

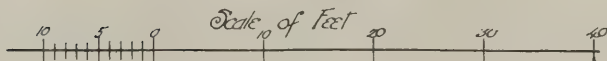
Strengthening a Retaining Wall.

A dry-stone retaining wall on the Albul Railway, Switzerland, built in the spring of 1902, gave trouble by slipping and was reinforced in an interesting way. The wall was founded on shallow earth overlying steeply sloping and rather loose rock, and in several places cut just a little into the loose surface rock. Settlement was anticipated, and so the wall was built a foot higher than the intended level of its top. Several slips occurred during construction, attributed to the water flowing along the surface of the rock, and soon after the wall was finished it was observed to be creeping down and bulging out. In November the top of the wall was rebuilt. It passed the winter well, but the spring thaws and rains caused a renewal of the movement, at a rate of $\frac{1}{2}$ in. to 1 in. per day. At the same time the wall bulged badly in places and assumed a stronger batter than it had when built. As this portion of the railway was in use, it was necessary to do something to prevent the failure of the wall. To give the dry-stone wall a secure foothold, as rapidly as possible a number of shafts were sunk down in front of it to reach the rock, and pillars of masonry made in quick-setting cement mortar were built up under the wall base, and also some way up in front of its face, being bonded into it, as well as possible, to stiffen it against the bulging tendency. These buttresses of masonry were anchored into the firmer strata of the rock. The work, which had to be carried out with great caution so as to avoid any breakdown of the wall, was done in the course of three weeks, and gave satisfaction, as no further settlement was observed. The masonry buttresses had to be taken down some 23 ft. below the foundation of the wall, which settled as a maximum about 4 ft., at the same time moving 13 ft. outward.

GREENHAY, BENSON
OXFORDSHIRE



GROUND FLOOR PLAN



(For particulars, see p. 136.)

Bad Year for Wood Blocks.—At the recent annual meeting of Millar's Karri & Jarrah Co., Mr. James White, the chairman, said their customers were almost entirely Government and municipal bodies and public companies, all of whom had been curtailing expenditure during the past year.

Keystones.

A new Hotel for the City of Tours has been erected from the designs of M. Laloux. It is embellished with some noteworthy sculpture.

Avonmouth's New Dock.—Satisfactory progress is being made with this dock, which is to cost £2,000,000. Mr. W. W. Squire is the chief engineer in charge.

New Isolation Wards at Colwyn Bay Hospital have been erected by Messrs. Wood & Co. from the designs of Messrs. Porter & Hunter, Colwyn Bay.

New Swimming Baths at Manchester are to be erected on a site between the Ashton New Road and the Ashton Old Road. Mr. H. Price, the city architect, has prepared the plans.

The R.I.B.A. Visit to Newcastle.—It has been found desirable to defer to a future date the visit of the Royal Institute of British Architects to Newcastle and the annual dinner, which were to have taken place early next month.

New Urban District Council Offices at Hindley have just been opened. They have cost about £7,300. The elevations are built of red pressed bricks, relieved with Yorkshire-stone dressings. The contractor was Mr. D. A. Ablett, of Wigan, and the architects were Messrs. Heaton, Ralph & Heaton, of Wigan.

A Horses' Memorial.—At Port Elizabeth it is intended to erect a memorial to the horses that fell in the Boer War. It takes the form of a drinking trough surmounted by the figure of a soldier giving water to a horse from a bucket. The contract for the work has been placed with Messrs. Whitehead & Sons, of Westminster.

Change of Address.—Messrs. Ed. Bennis & Co., Ltd., the well-known makers of mechanical stokers and furnaces, steam plant, gas producers and conveyors, have removed to their new fully equipped works, 10 acres in extent, at Little Hulton, Bolton. Their new address will be Ed. Bennis & Co. Ltd., Little Hulton, Bolton. Their telephone number is 13 Farnworth.

A Congregational Church at Caerphilly has been erected at a cost of £3,000 from designs by Mr. W. Beddoe Rees, A.R.I.B.A., of Cardiff. It accommodates 500 people and is in late Gothic style, the walls being faced on the outside with blue Pennant stone with Bath-stone dressings. Mr. J. Howells was the builder. The heating by low-pressure hot water has been carried out by Messrs. R. Alger & Sons, of Newport.

Appointment of an Architect.—The Leigh Guardians are wrangling over an agreement appointing Mr. R. K. Meacock, the valuer to the union, architect at a commission of 5½ per cent. Several members contend that as Mr. Meacock receives £400 a year as valuer he should devote the whole of his time to the duties of that office, and not take up other duties estimated to bring him in an additional £100 per annum. A motion that the agreement be determined was, however, lost by 15 votes to 12.

Waltham Abbey Restoration.—The Bishop of St. Albans has issued a faculty authorizing the restoration of Waltham Abbey Church in accordance with the latest design of Mr. J. A. Reeve. Opposition was recently raised by the Society for the Protection of Ancient Monuments to the threatened removal of the existing eighteenth-century parapet. A compromise has been arrived at, and in place of the corner pinnacles as originally proposed a scheme has been approved for the erection of a new battlemented parapet and the addition of square turrets at the angles of the tower. This will restore the tower to the appearance of the structure erected in 1556-58, which remained until 1798. The estimated cost of the contemplated works is £2,100.

A new School at Auchterderran has been erected from designs by Mr. William Williamson, architect, Kirkcaldy.

New Headquarters at Edinburgh for the Queen's Rifle Volunteer Brigade (Royal Scots) are being erected in Forrest Road at an estimated cost of £10,000. Messrs. Cooper & Taylor, of Edinburgh, are the architects.

Orpington Priory, Kent, one of the oldest portions of which is a stone annexe erected in 1393, has been sold. The mansion is well preserved, and the interior contains some fine carving and oak panelling.

A Roman Catholic Chapel at Great Malvern is to be erected according to plans prepared by the late Mr. Peter Paul Pugin. It will be known as the Chapel of Our Lady and St. Edmund, and will cost about £7,000.

Fire Protection in Aberdeen.—A report has been prepared by the burgh surveyor, the city architect and the fire-master on the inspection of buildings in the city used for public meetings, and the Plans Committee of the Town Council ask a remit to communicate with the proprietors of the buildings mentioned in the report, with the view of having the necessary improvements carried out.

The Parish Church of Caerwys—one of the most ancient and interesting in the diocese of St. Asaph—is to undergo further restoration at a cost of £550. Seven or eight years ago extensive restoration to the fabric took place at a large cost, and the present additional work will include the renovation of the south aisle and the provision of a new porch, vestry and heating apparatus.

The first portion of the new Birmingham University Buildings (the architects of which are Messrs. Aston Webb and E. Ingress Bell) was occupied on September 5th, work being formally commenced at the smelting-house in connection with the metallurgical department. The building has taken a year to erect, and has cost about £10,000. It will be a long time before the other portions of the university buildings are complete.

The London County Council Central School of Arts and Crafts announces its ninth session to commence on Monday, September 19th. Pending the completion of the permanent building in Southampton Row, additional temporary accommodation has been secured, and a large number of practical classes are conducted by expert teachers, including architecture, furniture design and cabinet work, carving and gilding, modelling and drawing from the cast and from life, stained glass, embroidery, silversmiths', goldsmiths' and jewellers' work die-sinking, enamelling, bookbinding, writing and illumination, lithography, woodcuts in colour, and miniature and fan-painting. Prospectus and full particulars will be forwarded on application to the Curator, 316, Regent Street, W.

A remarkable tunnelling operation is proceeding at the Niagara Falls. A tunnel 700 yds. long is being excavated beneath the upper rapids of the Niagara River and behind the great Horseshoe Fall. First, a shaft was sunk near the shore, and then a lateral tunnel run out behind the waterfall. An opening is made in the face of the precipice, in front of which is a sheet of the falling cascade 12ft. thick. The upper stratum at the Falls is the famous Niagara limestone, an exceedingly hard rock, to the presence and durability of which the Falls are due. Beneath this are beds of shale and slaty rock, and the material cut out to make the tunnel is of this nature. Thousands of tons of the rock have been dumped behind the waterfall, but they speedily disappear. The tunnel is being made in connection with the Toronto and Niagara Power Co.

Ventilating Experiments at the G.P.O. are now being made with the view of purifying the air of some of the rooms by means of the electrical production of a current of ozonised air.

Stage Furniture.—Messrs. Oetzmann & Co., of 62 to 79, Hampstead Road, W., have supplied the furniture and draperies for Mr. Israel Zangwill's new play, "Merely Mary Ann," produced at the Duke of York's Theatre last week.

Some new Government Buildings.—It is announced that the Government have purchased a considerable tract of land behind the Colchester station hospital, and that contracts for buildings are expected shortly, the first amounting to £80,000.

Birkenhead's Victoria Memorial.—The cost of the Eleanor Cross which is to be erected as a memorial to Queen Victoria in the Hamilton Square Gardens, Birkenhead, recently acquired by the Corporation, will be £1,300. The design has been voluntarily prepared by Mr. Edmund Kirby, F.R.I.B.A. Standing upon a base of eight stone steps, the memorial will be 70ft. in height. It is to be constructed of hard weather-stone of an agreeable colour.

St. Mary-le-Strand Church.—But for a queen's death, travellers going eastwards along the Strand to-day would have seen a small turret, instead of the present spire, on the top of the church of St. Mary-le-Strand, which was completed on September 7th, 1717. The original design by Gibbs included a statue of Queen Anne, to be placed on a lofty column near the west front; but on the death of the queen this idea was abandoned, and the impression of height was obtained instead by the spire.

At the Montrose Royal Lunatic Asylum a new villa has been opened for inmates at a cost of about £6,300. Mr. John Sim, C.E., of Montrose was the architect. The contractors were:—Masons, Messrs. Reid & Burnett, Montrose; joiner, Mr. John Rait, Montrose; plumbers, Messrs. C. Wood & Co., Montrose; slaters, Messrs. W. Brand & Son, Arbroath; tilers and plasterers, Messrs. Burness & Son, Montrose; heating engineers, Messrs. A. L. Peacock & Co., Dundee; asphalters, Messrs. F. B. Flood & Co., Edinburgh. The whole work has been carried out under the personal superintendence of Mr. W. C. Orkney, the resident surveyor of works to the asylum.

Another Model Village.—The need for workmen's dwellings at Colwyn Bay has suggested the formation of a model village, or "garden city," on somewhat similar lines to those adopted at Port Sunlight and Bournville. A suitable site has been found on the Tan'rallt estate, on the main road towards Mochdre, and the Colwyn Bay Garden Dwellings Co., Ltd., has been formed and registered. The architects are Messrs. Chadwick & Booth, of Post Office Buildings, Manchester; and 6,000 £1 shares are now offered to the public. A capital of about £4,000 is needed to enable building operations to be commenced.

The New War Office.—Good progress is being made with the erection of the new War Office in Whitehall. The structure when finished will contain 400,000 cub. ft. of worked Portland stone and 4,000 tons of steel (all English manufacture), while no fewer than 25,000,000 bricks will have been utilized. Generally speaking, the plan of each floor consists of a spacious corridor, which environs the building, and on each side of which are various chambers, light and air being obtained by means of large areas lined with ivory-white glazed bricks. The site is a parallelogram, each of the four sides having a full street frontage. There will be an entrance on each of these sides with separate staircases, and the main one, approached from Whitehall, is to be of marble.

Liverpool Cathedral.—Sir William B. Forwood, chairman of the executive of the Liverpool Cathedral Committee, noting that there are erroneous impressions abroad in regard to the amount collected and promised for the cathedral, writes: "Our funds in hand and promised amount to £199,000; in addition to this we have special gifts of the value of £35,000, making a total of £234,000. We have spent in the purchase of the site and in legal expenses £31,000, leaving an available sum of £168,000 for building purposes. The portion of the building we are about to erect, it is estimated, will cost £240,000, so that we require further funds to the extent of £70,000. This first portion of the cathedral will accommodate a congregation of 3,500, and we hope to complete it within six or seven years."

Housing.—At the Trade Union Congress at Leeds last week Mr. E. C. Gibbs (House Decorators and Painters) moved a resolution reaffirming its former resolutions on the housing question, and expressing regret that no satisfactory attempt had been made to secure the provision of cheaper loans to the municipalities for housing purposes. Various suggestions were offered in the resolution as a solution of the problem; among them cheaper money and speedier and less costly procedure for obtaining land by municipalities, the extension of workmen's trains and trams were suggested. Alderman C. W. Bowerman (L.C.C.) seconded the motion. He said that houses were ill-constructed and badly ventilated, and if the congress took up the movement referred to in the resolution it could not do better work. After some discussion the resolution was carried.

Enquiries Answered

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Furniture and Decoration.

BURGESS HILL.—E. H. S. writes: "Where can I obtain the catalogue 'Examples of furniture and decoration,' by Gillows, mentioned in your columns?"

Apply to Messrs. Gillow & Co., 406, Oxford Street, W.

Fletcher's History.

BIRMINGHAM.—W. T. C. writes: "I should be glad if you could give me any idea where I could get a copy of Fletcher's 'History of Architecture.'"

Mr. Batsford informs us that a new edition of Fletcher's "History of Architecture" is in active preparation, but will not be published until early in November.

Examinations for Sanitary Inspectors.

GLASGOW.—H. F. writes: "What subjects are necessary to pass an examination for a sanitary inspector?"

Examinations for sanitary inspectors are held by the Sanitary Institute, and particulars may be obtained from the Secretary at the Parkes Museum, Margaret Street, London, W.

Stucco on House.

NOTTINGHAM.—G. F. writes: "A house has been stuccoed and joints shown to imitate stonework. The house has been painted outside every four (or five) years, which necessitates creepers, &c., being pulled down. A few years ago an addition was built and the walls were made to match the old, but were not painted. (1) What could be done to the old, so that it would not require painting? (2) Could it be scraped, hacked and then restuccoed? (3) What

would it cost (roughly)? Kindly suggest a remedy."

(1 and 2) We think replastering would be the best remedy. You should scrape the paint off as much as possible and use a paint remover to get the surface clean, and then hack the surface to give a key. (3) 3s. per yd. super.

Ancient Lights: Fee for Sale of Property: Charge for Tracings.

DORSET.—DOUBTFUL writes: "(1) Which is the correct period necessary to prove the right to an ancient light? (2) Is an architect and surveyor entitled to charge a fee for negotiating the sale of freehold property by private contract, or is it legally the work of an auctioneer or solicitor? (3) What is the usual fee charged for preparing a set of tracings submitting them and complying with by-laws of a district council—the plans consisted of: (1) tracing of two plans; (2) sections front, back and side elevations, one tracing of block plan showing fences, paths, a system of drainage for a pair of semi-detached villas costing £1,500?"

(1) Nineteen years and a day. (2) Yes; see scale of fees in "Specification" (published from our offices). (3) Charge according to time occupied and materials.

P.A.S.I.

ALDERSHOT.—STUDENT writes: "Is it possible for a young man who has a knowledge of building construction and surveying to study for the Professional Associateship Examination of the Surveyors' Institution (Valuation Division) without professional coaching?"

We advise you to get personal instruction, as valuation cannot be thoroughly learnt from books.

Fee for Plans of Cottages.

DUBLIN.—F. C. C. writes: "I prepared plans and specification for a number of artisans' dwellings for four different sites; my professional fees for doing the work being by a lump sum (arranged). Tenders having been obtained, and the cost of fifty one-storey cottages on one site being too excessive, I was instructed to prepare revised plans and specifications reducing the size, &c. Tenders have now been accepted for these revised cottages, amounting to £7,995 for the fifty. What percentage am I legally entitled to charge for the preparation of the plans and specifications? I am not looking after the works."

We think you are entitled to 1 per cent. on the accepted tender.

Schoolroom Dadoes.

EXETER.—ECONOMY writes: "(1) Do you know of any cheap substitute for salt-glazed brick for use on schoolroom dadoes? (2) Have you ever heard of self-coloured linoleum being used? If so, how is it applied, on what foundation, and how fixed? (3) Could you state approximate costs per yard fixed?"

You might use ordinary glazed tiles or the very cheap variety of glass tiles such as "Opalite," or the walls might be rendered in cement and painted. (2) No, we have not heard of this, and do not favour its use. If used it would be fixed by tacking it into place on a plaster ground and with a dado rail at top. (3) Cost of linoleum plus about 1s. per yd. super. for fixing.

Library Planning.

LONDON, N.—B. writes: "In what issues did the series of articles on the planning of public libraries appear in your columns?"

We have never published such a series, but in our issue for February 22nd, 1899, will be found a report of two papers on this subject by the late Mr. J. M. Brydson and Mr. F. J. Burgoyne, read before the R.I.B.A., and in our issue for March 19th, 1902, a report of a

paper on "The Planning of some recent Library Buildings in the United States," by Mr. Sidney K. Greenslade, A.R.I.B.A., also read before the Institute. An illustrated article on "The Design of Public Libraries," by Mr. Maurice B. Adams, F.R.I.B.A., appears in "Specification No. 6."

Trade and Craft.

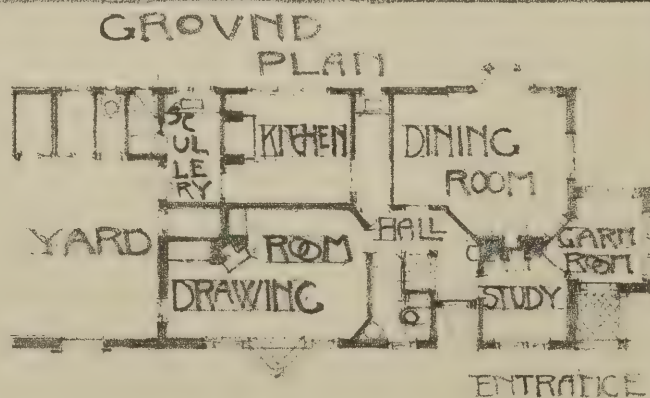
An Electrical Catalogue.

We have received from the Edison & Swan United Electric Light Co., Ltd., three new sections of their catalogue, namely: Section I., "Royal Ediswan" lamps; Section IV., measuring instruments; and Section V., wires and cables. Section I. contains all the latest forms of "Royal Ediswan" lamps, and embraces low and high voltage standard lamps, high candle-power lamps, "Queen" reflector lamps, obscured, tubular, crinkled and olive lamps, "Royal Ediswan" traction and ship lamps, and a large variety of special small bulb patterns, as well as focus, cell viewing and radiator lamps. A good deal of useful information is also set forth at the commencement. The blocks are well produced, and give a very clearly defined representation of the lamps. Section IV. contains measuring instruments of all sorts; a large number of pages are devoted to the "Ediswan" gravity and moving coil instruments and, these are listed in a large number of sizes and varieties, in order to meet all requirements. Tables of dimensions and diagrams for mounting are also provided. Amongst moving coil instruments we notice the "Sector" and "Edgewise" patterns. The former can be provided either to mount direct on the switchboard or on brackets when required to revolve, or for fixing at end of slate. The edgewise pattern is provided with the usual bracket for moving in a vertical plane, but can also be fitted on the top of the switchboard. Special attention is drawn to the "Ediswan" separate shunts for ammeters, which are claimed to be the best of their kind, being made without any soldered joints, and thus avoiding all thermo-electric and contact E.M.F. effects. Milli-ampere and milli-volt meters also find a place; these are built on the moving coil principle. Cardew voltmeters, which we understand were originally made by the Company, are listed in many varieties, and there is a large selection of "Ediswan" cell-testing instruments, for small readings, and portable instruments for large readings, lamp-testing ammeters, detectors, galvanometers, &c. The remainder of the catalogue is devoted to a selection of recording instruments, meters and testing sets. Section V. is devoted entirely to wires and cables which are listed in large variety, in vulcanized and pure rubber, lead covered, armoured, concentric and many other patterns. Flexible cords receive special attention, including flexibles for dynamos and switchboards, motor cars, ships, bells, telephones, &c., and some very useful pages are added for fuse, binding and resistance wires. The introduction comprises some useful information on joint-making, a table for calculating fall of potential, and a wiring table for "Royal Ediswan" lamps, showing how many lamps of various candle-power, voltages and wattages, can be fed by different standard cables, both on the basis of 1,000 amperes per square inch and on the basis of the I.E.E. rules. These sections should be in the hands of every buyer for the coming season, and the Company take steps to despatch the catalogues without asking their customers to write for them. They would, however, be obliged if customers would advise them when they change their addresses, in order that they may be kept fully provided with all the latest "Ediswan" catalogues.

Complete List of Contracts Open.

DATE OF DELIVERY.		WORK TO BE EXECUTED	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:				
Sept.	15	London, S.W.—Convenience	Lambeth Borough Council ..	H. Edwards, 346 Kennington Road, S.E.
"	15	London S.E.—Pit-house	Lewisham Borough Council ..	Surveyor, Town Hall, Catford.
"	15	London S.W.—Convenience	Lambeth Borough Council ..	Henry Edwards, 346 Kennington Road, S.E.
"	16	Southgate—Making-up of Private Streets	Urban District Council ..	G. G. Lawson, Council's Surveyor, Southgate.
"	16	Morton Fen and Hacconby Fen, Lincs— Cottage, &c.	Mr. W. J. Brown	Jesse Clare, Architect, Sleaford
"	16	Worsborough, Yorks—Cottages	Stoke Farm Committee	Crawshaw & Wilkinson, Architects, 13 Regent Street, Barnsley.
"	17	Bulcote near Nottingham—Cottages	Exors. of late William Walker ..	A. Brown, M.I.C.E., City Engineer, Guildhall, Nottingham.
"	17	Spunham, Millom, Cumberland—Farmhouse	Guardians	A. Walker, Applehead, Millom
"	17	Birmingham—Two Cottage Homes	Corporation	C. Whitwell & Son, 23 Temple Row, Birmingham.
"	17	Aberystwyth—Workmen's Houses	—	Borough Surveyor's Office, Smithfield Road, Aberystwyth.
"	17	Treviles—Completion of Farmhouse	—	Sampson Hill, Architect, Green Lane, Redruth.
"	17	Ruan-Lanhorne, Cornwall—Farmhouse, &c.	—	Sampson Hill, Architect, Green Lane, Redruth.
"	17	Walla and Crylla, Cornwall—Alterations, &c. to Farm Buildings.	—	—
"	17	Barnetby-le-Wold—Additions to School	—	Scorer & Gamble, Bank Street Chambers, Lincoln.
"	19	London, S.E.—Addition to Caretaker's Apartments, Nunhead Library.	Camberwell Borough Council ..	Borough Engineer, Town Hall, Camberwell.
"	19	Abergavenny—Widening Bridge	Rural District Council	John Gill, 4 Brecon Road, Abergavenny.
"	19	King's Heath, near Birmingham—Depôt, &c.	King's Norton and Northfield U.D.C.	A. W. Cross, 23 Valentine Road, King's Heath.
"	19	Amsterdam—Renewal of Viaduct	—	Management of the Company, Amsterdam.
"	19	Colchester—Covered Ways	Tramways Committee	H. Goodyear, Borough Engineer, Town Hall, Colchester.
"	19	St. Annes-on-Sea, Lancs—Tower, &c.	—	Wright & Hope, Surveyors, Lancaster.
"	20	Kingston-on-Thames—Alterations and Repairs to House	Guardians	W. H. Hope Seymour Road, Hampton Wick.
"	20	London, W.—Destructor Buildings, &c.	Acton District Council	E. J. Ebbetts, Surveyor, 57 High Street, Acton, W.
"	21	Kanturk—Repair to Cottages	Rural District Council	William Murphy, Assistant Clerk to Council, Kanturk.
"	21	Woolwich—Laundry Building	Guardians	C. W. Brooks, 63 Finsbury Pavement, E.C.
"	22	Abergavenny, Wales—Building	Monmouthshire Asylum Committee of Visitors.	E. A. Johnson, St. Mary's Chambers, Abergavenny.
"	22	Bristol—School Enlargement	Education Committee	Peter Addie, Council House, Bristol
"	23	Llandrindod, Wales—Presbyterian Chapel	—	W. B. Rees, Architect, 37 St. Mary's Street, Cardiff.
"	23	Tol-pedn-penwith, near Land's End, Cornwall—Coastguard Buildings.	—	Superintending Civil Engineer, H.M. Dockyard, Devonport.
"	23	Dymchurch, Kent—Coastguard Buildings	—	Director of Works Department, Admiralty, 21 Northumberland Avenue, W.C.
"	26	Liverpool—Post Office	Commissioners	Cropper, H.M. Office of Works, G.P.O., Liverpool.
"	27	Tipton—Library Buildings	Urban District Council	W. H. Jukes, Public Offices, Tipton.
"	27	Llangollen—Alteration, &c., to Market Hall and Assembly Rooms	Urban District Council	Surveyor, U.D.C., Llangollen.
"	27	Holbeck, Leeds—Sorting Office	Commissioners	H. G. Nixon, H.M. Office of Works, Infirmary Street, Leeds.
"	28	Leigh, Lancs—Municipal Buildings	Corporation	J. C. Prestwich, Bradshaw Gate Chambers, Leigh.
"	30	Poquian, near Fowey—Coastguard Buildings	—	Superintending Civil Engineer, H.M. Dockyard, Devonport.
Oct.	31	Wallasey—Public Offices	Urban District Council	H. W. Cook, Public Offices, Egremont, Cheshire.
No date	"	Darlington—Roof Repairs	Robert Stephenson & Co., Ltd. ..	R. Stephenson & Co., Ltd., Locomotive Works, Darlington.
"	"	Bradford—Warehouse	J. Fenton & Sons	F. & J. A. Wright, 105 Wakefield Road, Bradford.
"	"	Wallasey—Public Offices	Urban District Council	W. H. Cook, Clerk to Council, Public Offices, Egremont, Cheshire.
"	"	London, S.W.—Erection of Block of Shops	—	Palgrave & Co., Architects, 28 Victoria Street, S.W.
ENGINEERING:				
Sept.	15	Pentre, Glamorgan—Pumping Station, &c.	Rhondda U.D.C.	O. Thomas, Engineer, Gas and Water Offices, Pentre.
"	15	Amsterdam—Pontoon, &c.	S. Holland Provincial Council ..	Messrs. Van Cleef Brothers, The Hague
"	17	Birmingham—Railway Siding	—	James & Lister, Lea & Sons, 19 Cannon Street, Birmingham.
"	19	Seacombe Ferry, Cheshire—Floating-stage Repairs	Wallasey U.D.C.	Ferries Manager, Egremont Ferry.
"	19	Edinburgh—Cable Ropes	Edinboro' and District Tramways Co.	John E. Pitcairn, 1 South Charlotte St., Edinburgh.
"	20	Barking, Essex—Light Railways	Urban District Council	H. Hargreaves, Clerk, Public Offices, Barking.
"	20	Roxby-cum-Risby, Lincs—Well, &c.	Scunthorpe U.D.C.	A. M. Cobban, Engineer, Scunthorpe.
"	20	India Office, S.W.—Electrical Plant	—	Director-General of Stores, India Office, Whitehall.
"	21	Hammersmith—Excavating	Borough Council	H. Mair, Borough Surveyor, Hammersmith.
"	26	Ilford—Heating and Lighting	Urban District Council	C. J. Dawson, 12 Cranbrook Road, Ilford.
"	26	Sunderland—Joist Gearing	River Wear Commissioners ..	H. H. Wake, Engineer's Office, Commissioners' Quay, Sunderland.
"	27	Aberdeen—Car Tops	Tramways Committee	J. A. Bell, Electrical Engineer, Electricity Works, Milburn Street, Aberdeen.
"	27	London, N.—Electricity Works	Edmonton U.D.C.	W. F. Payne, Clerk, Town Hall, Edmonton.
"	30	Cudworth, Yorks—Liquefying Tanks, &c.	Urban District Council	Fairbank & Son, Lendal Chambers, York.
Oct.	4	London, S.W.—Plant	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
"	4	London, S.W.—Pumps, Motors, &c.	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
"	4	London, W.—Reconstructing Bridge	London County Council	Maurice Fitzmaurice, County Hall, Spring Gardens, S.W.
"	4	London, S.W.—Electric Car Traversers	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
"	4	London, S.W.—Condenser, Piping, &c.	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
"	5	Portnoo, co. Donegal—Pier	Board of Public Works	H. Williams, Office of Public Works, Dublin.
"	12	Lerwick, Scotland—Harbour Extension Works	Harbour Trustees	Clerk, Harbour Trustees' Office, Lerwick.
No date	22	Bahia, Brazil—Railway	—	Secretary of Agriculture, Bahia, Brazil.
"	"	Rochdale—Wiring	Tramways Committee	C. C. Atchison, Borough Engineer, Rochdale.
IRON AND STEEL:				
Sept.	15	New Malden, Surrey—Ironmongery &c.	Malden and Coombe U.D.C. ..	Clerk to the Council, Council Offices, New Malden.
"	15	Bradford—Wrought-Iron Steam Tubing	Gas Committee	Mill Street Gasworks.
"	16	Lancaster—Ramparts Railing	Streets Committee	J. C. Mount, Borough Surveyor, Lancaster.
"	16	London—Ironmongery	St. Giles (Camberwell) Guardians	Guardians' Offices, 29 Peckham Road, Camberwell.
"	20	India Office, S.W.—Stores	—	Director-General of Stores, India Office, Whitehall, S.W.
"	21	Darlington—Fencing	Waterworks	G. Winter, Borough Engineer, Darlington.
"	21	Swanley, Kent—Iron Fencing	Metropolitan Asylums Board ..	C. D. Mann, Office of Board, Embankment, E.C.
"	22	Amsterdam—Steel Rails, &c.	Municipal Council of Hague ..	Gemeente Werf, The Hague.
"	23	Christiania—Steel Rails	Norwegian State Railway Authorities.	H.M. Consul General, Christiania.
PAINTING AND PLUMBING:				
Sept.	16	Dublin—Oils, &c.	Commissioners of Public Works	H. Williams, Secretary, Public Works Office, Dublin.
"	16	Dublin—Brushes	Commissioners of Public Works	H. Williams, Secretary, Public Works Office, Dublin.
"	17	Sheffield—Painting	Guardians	A. E. Booker, Clerk to Guardians, Union Offices, Westbar, Sheffield
"	17	Middleton—Painting	Guardians	Master, Workhouse, Middleton.
ROADS AND CARTAGE:				
Sept.	16	Wimbledon—Making-up	Urban District Council	Surveyor, Council Offices, Broadway, Wimbledon.
"	16	London, N.—Making-up Roads	Southgate U.D.C.	G. G. Lawson, Surveyor, Town Hall, Southgate.
"	19	Stevenage—Tar Paving, &c.	Urban District Council	W. Onslow, Clerk, Council's Offices, Stevenage.
"	19	Erith, Kent—Street Works	Urban District Council	Surveyor, Bexley Road, Erith.
"	19	Bangor, co. Down—Road Metal	Urban District Council	Jas. Milliken, Clerk to Council, Town Hall, Bangor, co. Down.
"	2	Acton—Destructor Buildings and Chimney Shaft	District Council	J. D. Ebbetts, Surveyor, 57 High Street, Acton.
"	20	Barking, Essex—Road Improvement Works	Urban District Council	C. F. Dawson, Surveyor, Public Office, Barking.
"	20	London, N.—Road Works	Hornsey Town Council	E. J. Lovegrove, Borough Engineer, Southwood Lane, Highgate, N.
"	21	London, N.W.—Roadmaking Works	—	W. Hollis, Surveyor, Church End, Finchley
"	21	London, S.W.—Making-up Mews	Urban District Council	Francis Wood, Borough Surveyor, Town Hall, Fulham.
"	21	Barking—Levelling and Tar Paving	Guardians	C. J. Dawson, East Street, Barking.
"	21	Greenwich—Granite Spalls	—	S. Saw, Clerk, Union Office, Greenwich.
"	21	Tredegar, Mon.—Limestone	Bedweity U.D.C.	J. A. Shephard, Clerk, Town Hall, Tredegar.
"	24	Swindon—Street Works	Corporation	J. H. Hamp, Borough Surveyor, Town Hall, Swindon.
"	26	Beckenham—Road Works	Urban District Council	J. A. Angell, Surveyor, Council Offices, Beckenham.
"	26	Ilford—Levelling and Tar Paving	Urban District Council	C. J. Dawson, 11 Cranbrook Road, Ilford.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

September 21, 1904. Vol. 20, No. 502.

6, Great New Street, Fetter Lane, E.C.

Summary.

In the Lord Chamberlain's revised code of theatre regulations stringent provisions are made as to exits, entrances and fire appliances. Wet blankets and buckets filled with water are always to be kept in the wings and flies, all scenery, &c., is to be non-inflammable, and dry fire-drills must be held at least once a week in all theatres. (Page 149.)

Remarkable excavations have been made at Timgad, in Algeria, where the Roman town, buried for centuries, has been uncovered. (Page 148.)

The West Hartlepool Corporation proposes to utilize its destructor clinker for making bricks. The cost of manufacture is stated to be about 14s. per 1,000. (Page 156.)

It has been clearly established by the investigations of the Lightning Research Committee that there is very little advantage in placing isolated rods on an ordinary building. Conductors should be arranged to form a protective network, so that a stroke at any part would pass harmlessly to earth by one of the numerous conductors; damage by side-flash may be lessened by running a conductor along the ridge or parapets. (Page 157.)

Three large new hospitals were opened in Glasgow last week. One at Stobhill accommodates 1,650 patients, 100 nurses and 70 servants. The buildings have cost half a million of money. (Page 155.)

The cloister of St. Bartholomew-the-Great, Smithfield, is to be restored. For years it has been used as livery stables, with dwelling-rooms above. (Page 159.)

The building strike in New York is assuming serious proportions. It is due to the failure to carry out the policy of honour among thieves. A ghost of the notorious Sam Parks has arisen in the form of a man called Weinseimer, and the Building Trades' Alliance started by him now seeks to restore walking delegates to their former power. Out of it all may come the "open shop," in which case the strike may not have been in vain. (Page 152.)

The Junior Institution of Engineers paid a successful round of visits last month in Germany. At Frankfort, before going over the water, electricity and sewage works, the engineer gave a short lecture on these, aided by diagrams and drawings, so that the members were in a much better position for seeking any special information. This practice is worth following. (Page 156.)

The Associated Portland Cement Manufacturers, Ltd., announce a dividend for the past year of $5\frac{1}{2}$ per cent. on the preference shares, but no dividend on the ordinary shares. (Page 159.)

My precept to all who build is, that the owner should be an ornament to the house and not the house to the owner. —CICERO.

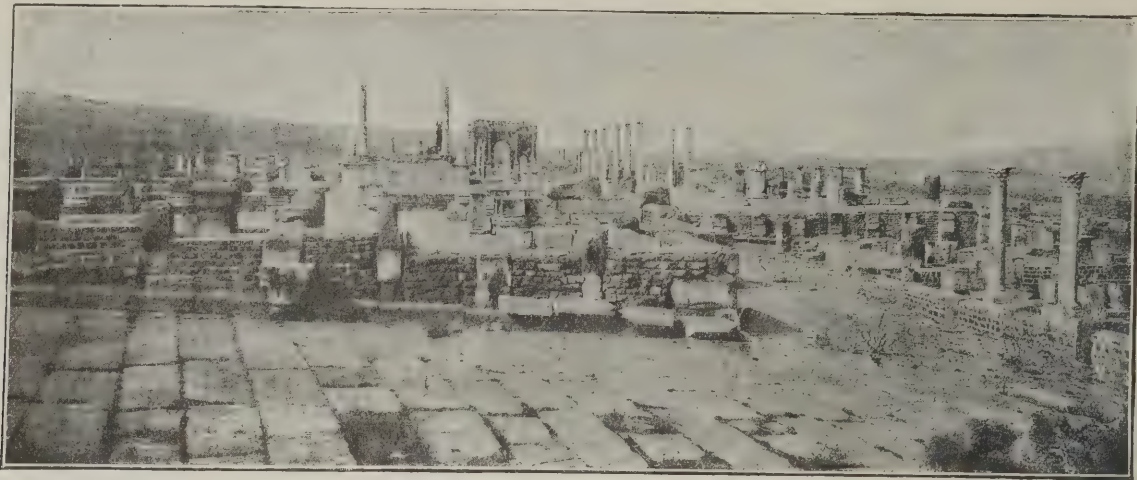
A Builders' Exchange. At Birmingham a project is on foot for the establishment of a Builders' Exchange. This is likely to prove exceedingly useful to all connected with the building trade of the city and should also be valuable to manufacturers and trade firms. We do not know whether a new building is proposed to be erected, but in any case room will be provided for the exhibition of all kinds of materials and builders' plant and machinery; there is also to be an exchange hall where members can meet each week, and an official publication is to be issued monthly. It will thus be seen that the project combines the mart with the office, affords means for business men in the Birmingham building trade to discuss their affairs, and brings together a representative collection of materials and plant. In this, of course, architects will take a share with builders, and doubtless the facilities of the Exchange will be greatly appreciated by them. The success of the scheme depends entirely on its being carried out in a thorough manner. The exhibits must be up-to-date and comprehensive: they must not be "scrappy," or the Exchange will be a dead failure at once: but there is no reason why this should be. The project is solely a business one and it offers many inducements to trade firms. The success of the Building Trades' Exhibition clearly proves that the bringing together of goods is profitable to manufacturers. Makers need to be always on the look-out for fresh business, and builders for new materials, while architects are equally concerned in both. Catalogues do much for the manufacturer and are essential to the buyer, but more business results from personal examination and conversation than from anything else. This Builders' Exchange, then, has a fair future before it.

Our new Directory. We are glad to be able to report that the novel scheme of a directory of builders which we announced two weeks ago has met with the approval of our readers. Correspondents and others praise it highly and assure us of the advantage they intend to take of it. For years past we have been continually receiving letters from architects, surveyors, engineers and others enquiring the names and addresses of builders in country districts who have

satisfactorily executed works of importance or artistic merit. There is a very real difficulty in finding contractors who are financially sound, not likely to go bankrupt, and free from the underhand, deceitful and dishonest tricks so often practised in order to increase profit. No architect can rely on builders who possess such an undesirable reputation: relations with them must perforce be vexatious and worrying to men who have quite enough responsibilities as it is. Every architect, too, knows the difference there is in the finish and character of work done by old-established or well-organized and good-sized firms. A firm which can give constant employment and is straightforward in its dealings gradually gathers the best workmen under its control, and a tradition is created that often makes the difference between artistic success and failure, to say nothing of constructive weakness. The best testimonial a firm of builders can have is the record of good jobs they have executed. None of the ordinary directories provide this. Good, bad, small and large builders alike are there found sandwiched together in confusion. Such a defect we propose to remedy by publishing once a month a directory of contractors arranged in order of counties and towns, with particulars of recent work done by them. We will forward full particulars on application. Most of the best work in this country is not put up to public tender, contractors being invited to submit estimates, and in country districts work is often given into their hands without competition. Therefore it is important to a contractor wishing to avoid being suddenly without a full complement of remunerative and satisfactory work to avail himself of every means at his disposal. The most powerful instrument of solicitation he can have will be our DIRECTORY.

Waldeck-Rousseau's Waistcoat.

The projected statue of M. Waldeck-Rousseau is causing æsthetic perplexity in Paris, says the "Daily Chronicle." How is that eminent man to be represented? In a frock coat, it is urged, he would be unreal. Gambetta in a tightly-buttoned frock-coat, if you like, but not Waldeck-Rousseau. So the sculptors and artists are in a quandary over the matter. However, it looks as if Waldeck-Rousseau's waistcoat, after all, would eventually occupy that place in sincere and candid art which has been made historical by Cromwell's wart.



TIMGAD EXCAVATIONS: THE FORUM.

ROMAN ARCHITECTURE IN ALGERIA.

SOME most interesting excavations have been made at Timgad, Algeria, of which we are now able to give some particulars and illustrations. They were commenced in 1883 by Duthoit and Boeswilwald and were continued until 1888, being resumed in 1892, when each pick brought to light some fragment of ancient art; and we are told that shortly there will appear before public eyes the *Thumegadi* of Procope, partly reconstructed, after an oblivion of a thousand years.

Timgad (an Arabian word) would appear to have been constructed at the beginning of the Christian era by Nematius Gallus, on behalf of Trajan. Destroyed in the sixth century by the Moors, earthquakes finished the work of the Berbers, and the town was buried for centuries in the sands and forgotten until at last unearthed by Ballu.

This ancient city is traversed by two principal thoroughfares, into which other streets run, that from south to north being called "Cardo Maximus" and that from

east to west "Decumanus Maximus." By following the latter one passes under the Trajan arch, which is pierced by three openings and decorated by columns of marble, statues, &c., the central opening being for chariots and the two on either side for foot-passengers. Porticos stand out along the route, supported by columns which protect numerous "shops," still in a good state of preservation, some of the doors even retaining their stone head-pieces.

Not far from the Trajan arch is to be seen a curious edifice founded in the third century by a Roman lady, whose statue has been preserved bearing an inscription relative to its foundation. It is a "macellum," or market, fronted by a portico of eight columns, of which only the bases remain. The entrance leads one into a court surrounded by galleries; in the centre, a fountain (almost intact) supplied the water necessary for the establishment.

From the main route one goes up a few steps to the forum, surrounded by a colonnade which still exists. The "Curia" (used by the municipal council) is an important monument; it consists of two distinct parts, namely, a vestibule to which access is gained

by a large door, and a spacious rectangular hall. From the forum a passage led straight to the theatre, to which entrance was obtained by three doors. As in the case of that of Philippeville, this theatre is supported against a lofty mountain, access being obtained to the upper parts by a door on the side of the hill, while two others led to the orchestra. It was sufficiently large to accommodate 4,000 persons.

The ruins of Timgad are so far inexhaustible that marble sheathing and small pillars of the "pulpitum" (equivalent to "the foot-lights" of present-day theatres) separating the pit from the proscenium have been found. It must not, however, be thought that the bringing to light of portions of this theatre has been an easy matter, for, in places, the embankments that had to be cleared away were no less than 22ft. high. Nor must the *thermæ* be overlooked, the double piscina of which are intact, with furnaces and heating conduits; the mosaics forming the paving are of a varied description, and marble statues of fancy colours ornament the halls.

Very interesting remnants of temples consecrated to Jupiter, Juno and Minerva have



TIMGAD EXCAVATIONS: TRAJAN TRIUMPHAL ARCH.



TIMGAD EXCAVATIONS: THE TRIUMPHAL WAY.

also been discovered, though, unfortunately, another ten years will be required for the complete exhumation of the remains of this Roman city.

Timgad is now being visited by armies of tourists, whose modernism spoils somewhat the grandeur of the ancient ruins.

THEATRE REGULATIONS.

The Lord Chamberlain's Revised Code.

A REVISED code of rules and regulations in regard to theatres within the jurisdiction of the Lord Chamberlain has just been issued. The following are the chief clauses:—

Exits and Entrances.

All doors and barriers must open outwards, and the management must allow the public to leave by all exit and entrance doors, which must be thrown open for the use of the audience at the end of the performance.

Sufficient gangways, passages and staircases for the exit of the audience must be provided and kept entirely free from chairs or any other obstructions, whether permanent or temporary, and the audience are not permitted either to sit or stand in such gangways.

The corridors must not be used as cloak-rooms, and no pegs for hanging hats or cloaks shall be allowed therein.

All exits from the theatre used by the public must be plainly indicated in 7in. letters over such exits and placed at a height of at least 6ft. gins. above the floor level.

The words "No Exit" must be clearly printed in 7in. letters, and when and where practicable placed at a height of at least 6ft. gins. above the floor level over all doors and openings which are in sight of the audience but which do not lead to exits.

All doors, except those marked "No Exit," must, if fastened during the time the public

are in the theatre, be secured during such time by approved automatic bolts only.

All curtains covering doors or in passages must be hung so as not to trail on the floor.

Each exit door from the auditorium and stage must have a distinct light fitted over it, such light to illuminate the exit notice and to be maintained throughout the performance.

All exit doors must have a notice clearly painted on them indicating the method of opening them.

Fire Appliances and Precautions.

An ample water-supply, where possible on the high-pressure main, with hose and pipes, must be available to all parts of the house.

The safety-curtain fitted in the proscenium opening must be lowered daily about the middle of the performance, and bear on it the words "Safety Curtain" in large letters.

Communication must be established between a point on the stage in close proximity to the releasing gear to the safety-curtain and the telephone alarm in connection with the nearest fire-brigade station.

Wet blankets or rugs, and buckets filled with water, must be always kept in the wings and flies and the approaches to dressing-rooms. Some person must be responsible for keeping the blankets, buckets, &c., ready for immediate use.

Hatchets, hooks or other means to cut down hanging scenery in case of fire must be always in readiness.

A report of any fire or alarm of fire, however slight, must be at once sent to the Lord Chamberlain's office and to the fire-brigade.

If a temporary proscenium be required it must be formed of non-inflammable material.

A sufficient number of employees must have definite duties allotted to them in the event of fire or panic, and statements of such duties must be posted up in conspicuous positions. Dry fire-drills must be held at least once a week in all theatres.

All open fireplaces or stoves must be protected by strong fixed iron wire-guards and fenders, part of which may be made to open for all necessary purposes.

All scenery, wings, sky borders and cloths, whether on the stage, in the auditorium or in other parts of the premises, must be rendered and maintained non-inflammable as far as practicable.

Lighting.

All fixed and ordinary gas-burners, whether about the stage or other parts of the theatre, must be furnished with efficient guards; and the service of light for the auditorium and entrance passages must be separate from that for the stage.

An additional means of lighting for use, in the event of the principal system failing, must be provided in the auditorium, corridors, passages, exits and staircases; and if oil or candle lamps are used for this purpose they must be of an approved pattern, properly fixed to an unflammable base out of reach of the public as far as practicable. Such lamps must be kept alight during the whole time the public are in the premises, and no mineral oil must be used in them.

The footlights and floats must be protected by wireguards.

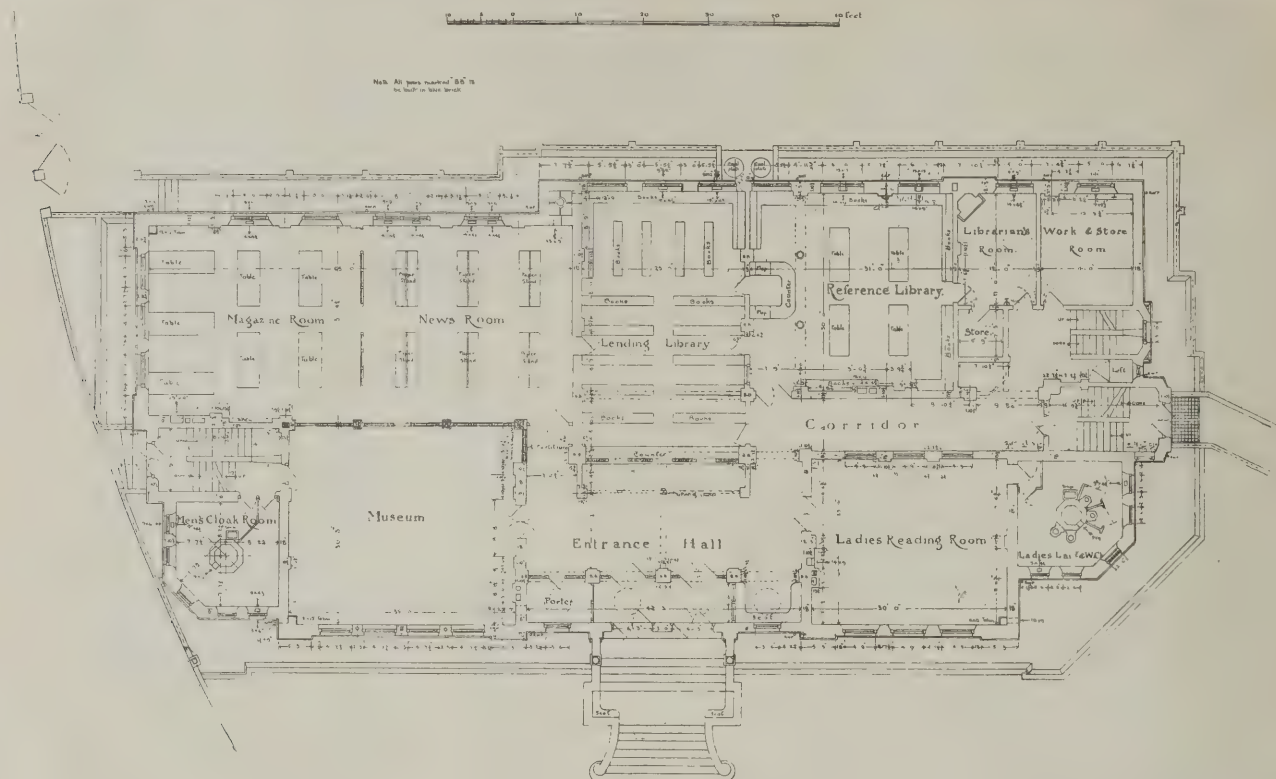
The rows or lines of gas-burners at wings must commence 4ft. at least from the level of the stage, and must be protected by fixed iron wireguards.

All gas taps within reach of the audience must be made secret. All gas-pipes must be made of iron or brass. All gas-burners must be protected by glass or wire globes.

Where there is an electrical installation a properly qualified man must be in charge of such installation.

In all cases in which it is desired to instal temporary lighting, notice must be given to the clerk of the London County Council, in writing, as long as possible before it is desired to commence the work.

Wires and cables must be adequately and firmly fixed, and must be similar to the



PUBLIC LIBRARY, ART, SCIENCE AND TECHNICAL SCHOOL, EASTBOURNE: GROUND-FLOOR PLAN. PHILIP A. ROBSON, A.R.I.B.A., ARCHITECT.

wires specified in the London County Council's regulations, and in all cases where the wires are within reach of the public they must be cased.

All joints must be soldered and taped if used for more than a week, and if used less than a week the wire must be soldered if larger than 7/20 S.W.G. or its equivalent. In either case the joints must be taped.

The circuits must be sub-divided as much as possible, no sub-circuit exceeding 10 amperes.

All temporary work must be immediately removed when no longer required for the purpose for which it was installed.

In the case of temporary work on the stage, all connections to the permanent installation must be removed immediately after each performance in which they are used,

unless permission be obtained to the contrary.

All main switches, fuses, &c., which are the property of the electric-supply company must be distinguished by being coloured red with a white band.

At least one pair of india-rubber gloves must be provided for the use of the electricians in connection with the electric-lighting arrangements as a precaution in the event of high-voltage occurring. The gloves must be kept on the stage switchboard and be kept in good order.

At least one bucket, filled with dry sand, must be kept in some accessible position on the stage in readiness for use in dealing with an electric fire, and one must also be kept in each of the intake rooms.

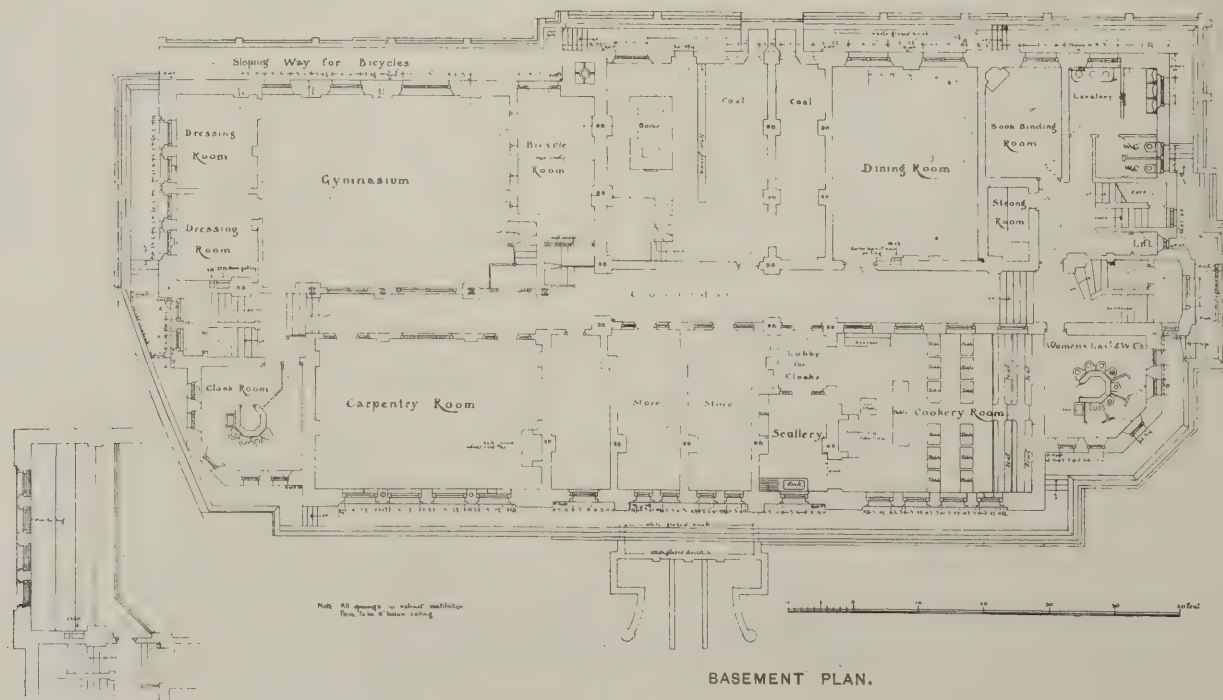
No structural alterations must be made in

the theatre without the sanction of the Lord Chamberlain's Department.

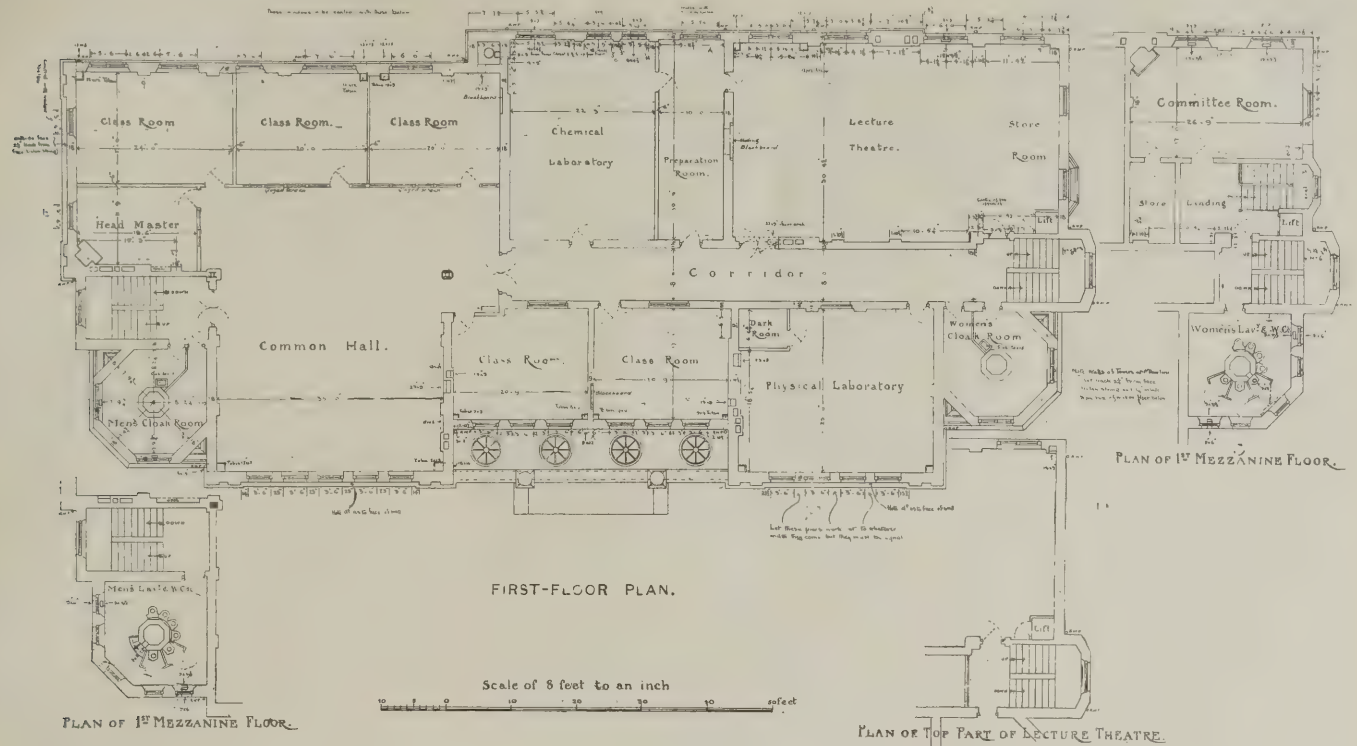
Counter-weights, where possible, must be carried to the walls of the buildings. (This regulation need not apply to existing theatres, but the ropes attached to the counter-weights must be constantly tested.)

No decoration or construction for the purpose of decoration must be employed in the dressing-rooms which does not adhere without any cavities to the surface of the wall.

The seating area assigned to each person must not be less than 2ft. deep and 1ft. 6ins. wide in all parts of the house where no backs or arms are provided to the seats, and not less than 2ft. 4ins. deep by 1ft. 8ins. wide where backs or arms are provided. In all cases, however, there must be a space of at least 1ft. in depth between the front of one seat



BASEMENT PLAN.



and the back of the next, measured between perpendiculars.

(The above regulation shall not apply to the seating now in existence except in cases where it is proposed to re-arrange the seating or to alter the premises.)

Before any alterations are made in the seating or in the arrangements of the premises, the person or persons in whose name or names the licence is granted must submit full particulars and a plan to the Lord Chamberlain's Department for approval.

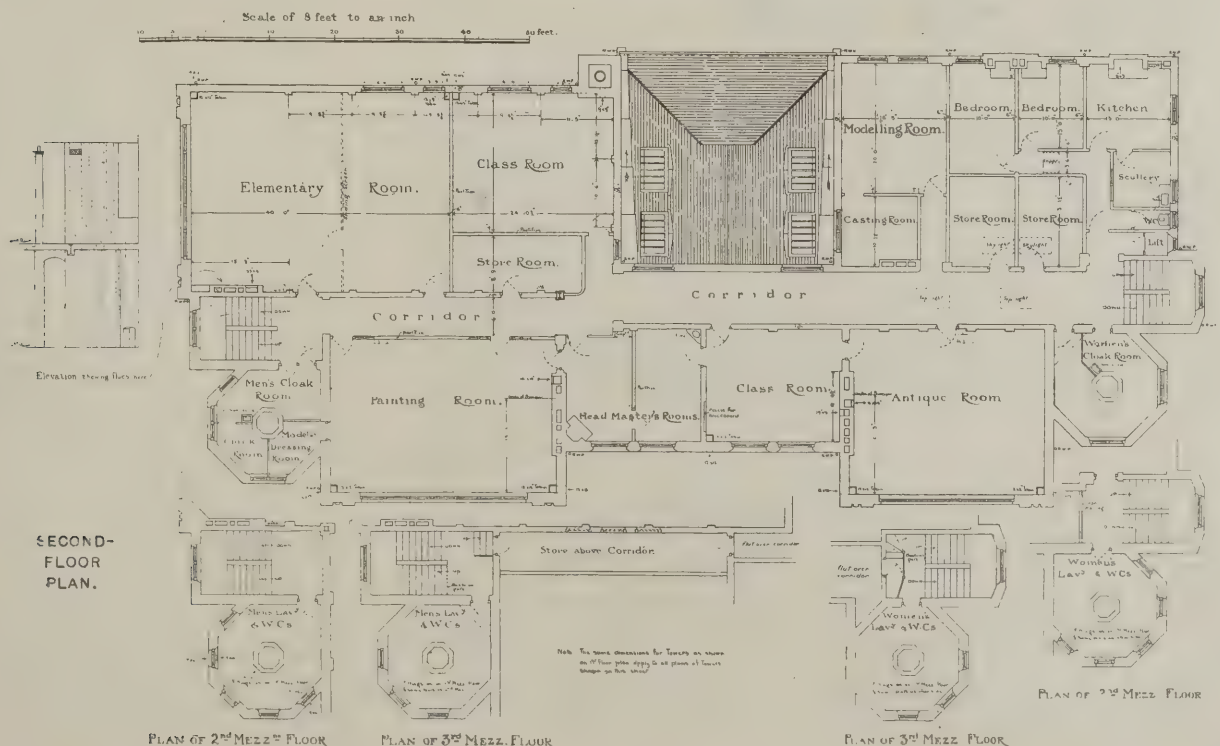
Where chairs are used they must be battened together at a distance of not less than 1ft. 8ins. from centre to centre where they have arms, and 1ft. 6ins. where they are without arms, and in lengths of not less than 4 nor more than 12 in a section.

OUR PLATES.

THE house for Messrs. Barelli & Falkner, called "Great Austins," is an attempt at a slightly reformed speculative plan. The walls and chimneys are covered with a rather smooth grade of rough-cast, the roof is of very quickly weathering tiles, and the window and door frames are painted blue. Messrs. Niven, Wigglesworth & Falkner are the architects, and Messrs. Crosby & Co. are the contractors.

The new public library, art, science and technical school at Eastbourne, erected from the designs of Mr. Philip A. Robson, A.R.I.B.A., was opened last month by the Duchess of Devonshire, assisted by many well-known men connected with

technical education. The accompanying plans show the accommodation on the several floors. Mr. F. G. Minter was the builder, his contract amounting to £34,730. The only sub-contractors engaged were Messrs. R. H. & J. Pearson, of Notting Hill, for heating. Practically everything else was done by Mr. Minter's own staff and local labour was used throughout, with the exception of a portion of the joinery and fittings, which were prepared at Mr. Minter's Putney works. The front of the building is of red bricks and Portland stone, the latter having been worked entirely on the site, special plant being put down for that purpose. We think readers will agree that this building has an imposing appearance. Mr. Robson was awarded the work in open competition.



THE GREAT BUILDING STRIKE IN NEW YORK.

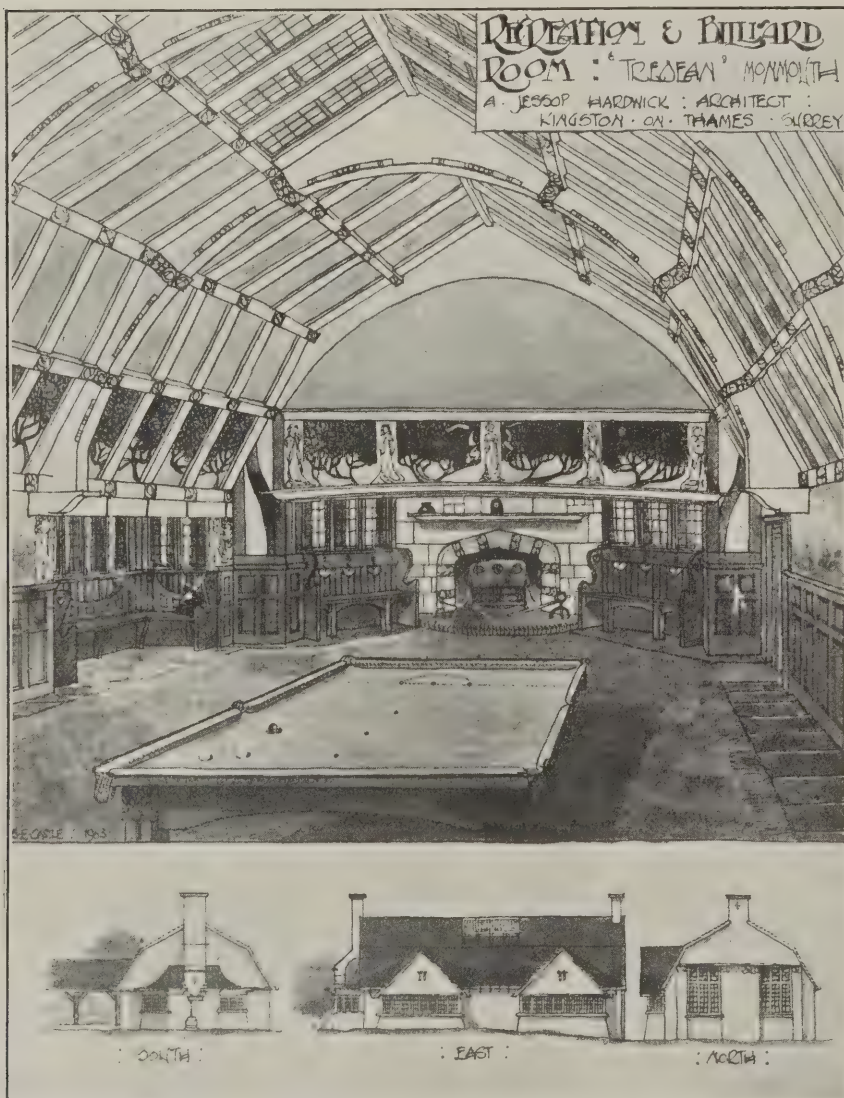
THE building strike in New York is beginning to assume serious proportions, and already thousands of men have been thrown out of employment, building operations are practically suspended, allied industries are disturbed, and losses are rapidly accumulating. But out of it all may come the definite establishment of the "open shop," in which case the present sacrifice may not have been in vain. The war against the "closed shop" is being vigorously waged in widely different sections of the country, has recently been assisted by decisions of the Appellate Courts of Wisconsin and Illinois, and promises to result in the most bitter struggle between capital and organized labour that the United States has ever seen. The trouble in the New York building trade may be described as due to the failure to carry out the policy of honour among thieves.

More than a year ago the building contractors of the city were so terrorized by an organization known as the Board of Building Trades, which consisted of the walking delegates or "business agents" of the various unions, and of which the late notorious Sam Parks was president, that in self protection they formed themselves into the Building Trades Employers' Association. This association, of which practically all the important building contractors were members, com-

menced an active struggle for the establishment of an arbitration agreement between the employers and the unions by which all differences would be submitted to a board of arbitration and sympathetic strikes abolished. The result was the disastrous strike of last summer, the conviction of Sam Parks for extortion, the disruption of the Board of Building Trades, and the final success of the employers. During the winter and spring months affairs ran along smoothly until the appearance of a new labour leader in the person of Philip Weinseimer, walking delegate of the Plumbers' Union, who proceeded to form the Building Trades Alliance with the object of breaking the arbitration agreement and once more restoring the walking delegates to their former power. Many of the unions joined the Alliance, and a pretext was sought for a trial of strength with the employers. This was found in the construction of a new twenty-storey skyscraper on lower Broadway by a member of the Employers' Association, where it was alleged that material was being used which had been manufactured by non-union labour. Without submitting this question to the board of arbitration, Weinseimer ordered a strike, and all the unions connected with the Alliance responded. The Employers' Association countered by locking out from all work of its members the unions that were taking part in the strike on this particular building. The course of the strike since then has developed some very interest-

ing points. Efforts to settle the matter having failed, the Alliance threatened to bring a suit against the Employers' Association as a monopoly formed for the restraint of trade, alleging that one of its objects was to force out of business the small contractors who were not members of its association. So far this suit has not been brought, and if it were it is doubtful if it would be successful. The Association, not being an organization engaged in inter-State commerce, is not amenable to the Sherman Anti-Trust Act, and any such suit would have to be brought under the common laws of New York State. While these forbid a monopoly, it would seem almost impossible to prove that the Association, which is not incorporated, is a monopoly, because outside contractors do exist. The second and most interesting point is the announcement on the part of the employers that unless the unions submit within a certain period they will declare the "open shop."

Up to the present the New York unions have not received the support of their national organizations in their action, and it has even been suggested that the latter are not in sympathy with the strike and may order the men to return to work, overruling the local walking delegates, but the "open shop" declaration is expected not only to excite the antagonism of the national organizations but to draw into the struggle all the thirty-two unions in the building trade, some of whom have lived up to their agreement with the employers. It is therefore a serious question for the employers, and it remains to be seen whether they will remain firm in their demands and settle this much vexed question once for all.—(Extracts from a correspondent's report in the "Times").



In the above design the frieze which continues entirely around the room is of worked canvas and the figures are in gesso relief. The whole of the details are kept severe, with a view to economy. The panels in the roof are covered in green canvas relieved by the white timbers of the roof. Externally the walls are covered with white rough-cast, the roofs with hand-made tiles, and the woodwork painted green.

Correspondence.

Acoustics.

To the Editor of THE BUILDERS' JOURNAL.
MANCHESTER.

SIR,—In reference to the above your correspondents seem apathetic—at least they do not give us all the good examples they know. I mentioned that the other side of the question was just as important, and we ought to have the failures. Therefore, I cite St. George's Hall, Liverpool, as a failure acoustically. Perhaps some industrious pupil will give us an idea of the plan of same and sizes, &c.—Yours truly,

W. K. BOOTH.

[A plan, section, elevation and other views of St. George's Hall, Liverpool, were published in THE ARCHITECTURAL REVIEW for June, 1904; also some other interior views in the issue for October, 1902.]

Schoolroom Dadoes.

To the Editor of THE BUILDERS' JOURNAL.
LONDON, W.

SIR,—Referring to the enquiry about schoolroom dadoes answered on p. 145 of your issue for last week, may I suggest that sheets of "Uralite" fixed to wood battens with rolled wrought-iron moulded fillets, fastened with round-headed screws, would form an effective and very durable wall-covering, which might be stained or painted.—Yours truly,

C. F. A. VOYSEY.

Household Fire Precautions.—The second edition of this useful set of instructions for preventing, extinguishing or escaping from fire, prepared by Captain Shean, consulting fire-brigade engineer, and printed on a card intended to be hung up in a prominent place, has been issued. It can be obtained wholesale of Messrs. Unwin, Queen Victoria Street, London, E.C., and retail (price 6d.) of all stationers.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Questions should in all cases be addressed to the Editor. The querist's name and address must always be given, not necessarily for publication.

Head of Water to overcome Friction and produce Given Velocity.

EDINBURGH. — HYDRAULIC writes: "On p. 72 of Greenwell & Curry's 'Rural Water Supply' the loss of head in a 4in. pipe discharging 72 gallons per minute in a main 4,000 yds. long is shown to be 83ft. Using the table at the end of Rivington's 'Building Notes,' Part IV., I make it—

$$\frac{L}{H} G^2 = 420,000;$$

$$4000 \times 3 \times 72^2 = 420,000 H;$$

$$\frac{4000 \times 3 \times 5184}{420,000} = H;$$

i.e., $H = 148$ ft. loss of head, which is 65ft. more than Rivington's. Adopting his loss of head (83ft.) and calculating the diameter of pipe required, I get—

$$\frac{L}{H} G^2 = (\text{Table number}).$$

$$\frac{4000 \times 3 \times 5184}{83} = 749493.$$

This corresponds to a pipe of 5in. diameter; in fact, I find my hydraulic gradient gets below my line of pipes when I come to the last section of 3in. pipes as given in Greenwell & Curry's example. Kindly point out where the error is."

I have not Greenwell & Curry's "Rural Water Supply" at hand for reference, but there are other sources available. Let H = head of water in feet, L = length of pipe in feet, d = diameter of pipe in inches, k = constant, c = cubic feet discharged per minute. Then by Beardmore's formula and table c

$$= \frac{k}{\sqrt{H}} L, \text{ whence } H = \left(\frac{L}{c} \right)^2 = \left(\frac{4000 \times 3}{151.02} \right)^2 =$$

$$\frac{12000}{172} = 70\text{ft. head. By Eytelwein's formula}$$

$$c = 4.71 \sqrt{\frac{d^5 H}{L}}, \text{ whence } H = \frac{L \left(\frac{c}{4.71} \right)^2}{d^5} =$$

$$\frac{4000 \times 3 \left(\frac{72 \div 6\frac{1}{4}}{4.71} \right)^2}{4^5} = \frac{12000 \times 5.978}{1024} = 70\text{ft.}$$

$$\text{head. By Hawksley's formula } G = \sqrt{\frac{(15d)^2 H}{\frac{1}{8} L}}$$

$$(G = \text{gallons per hour}), \text{ whence } H = \frac{G^2 \frac{1}{8} L}{(15d)^2}$$

$$= \frac{(72 \times 60)^2 \times \frac{1}{8} \times 4000 \times 3}{(15 \times 4)^2 \times 60^2} = \frac{(4320)^2 \times 4000}{60^2}$$

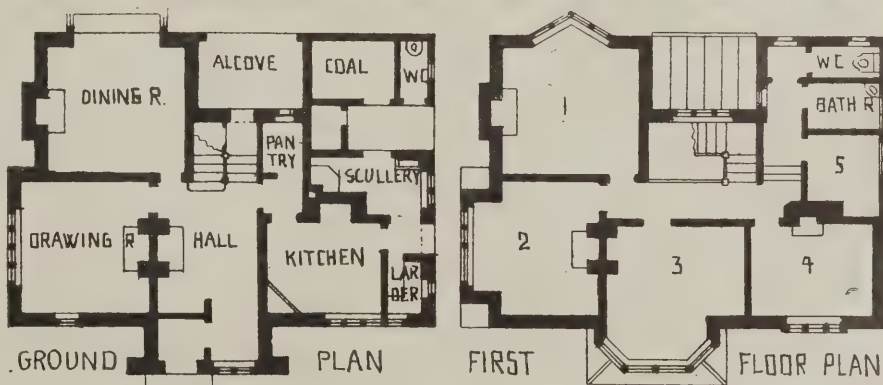
$$= 96\text{ft. head. By Box's formula for the head necessary to overcome friction } H = \frac{G^2 L}{240 d^5}$$

$$(\text{where } G = \text{gallons per minute, } L = \text{length in yards, } d = \text{diameter in inches}). \text{ Then } H =$$

$$= \frac{72^2 \times 4000}{240 \times 4^5} = \frac{5184 \times 4000}{240 \times 1024} = 84.375\text{ft. head.}$$

Then by Box's formula for the head to produce velocity $H = \frac{G^2}{215 d^4} = \frac{72^2}{215 \times 4^4} = \frac{5184}{215 \times 256}$

$$= 0.092\text{ft. head, or a total of } 84.375 + 0.092 = 84.467\text{ft. head. The average of these various results is 80ft. head. Now turning to Rivington's "Notes on Building Construction," Part IV., p. 343, Table XVIII., the 4in. diameter of pipe given in the last column is assumed to be only worth 3.43in. diameter owing to possible incrustation, and is therefore treated as a pipe of 3.43in. diameter, while the formulæ given above are for a new pipe of 4in. diameter. So that$$



HOUSE AT MALVERN WELLS. G. LEWIS SHEPPARD, A.R.I.B.A., ARCHITECT.

This house is nearing completion. It is built on the slopes of the Malvern Hills, with extensive views from the principal rooms. The walls are of local bricks covered externally with Portland cement rough-cast, whitewashed. The roof is of thick green slates, with courses diminishing towards the ridge. The windows are filled with wood casements having leaded lights. The exterior woodwork is painted green. The floors of the dining-room, drawing-room and hall are laid with wood blocks, and the ceilings of these rooms are plastered half-way up the joists.

to force the same quantity of water through an old 4in. pipe when obstructed by incrustation would take a head of 148ft., instead of 83ft. which is sufficient with the new pipe.

HENRY ADAMS

Air-Space at Rear of Buildings.

SHREWSBURY. — D. writes: "A building just built within an urban district council's area is found at its rear to be nearer to the opposite premises than the minimum distance required by the by-laws. The plans approved by the council show 10ft. from wall to wall, but the new building as erected only allows 9ft. 3ins. I send you such extracts from the by-laws as bear on the point, from which it seems that the distance between the eaves should be 15ft. instead of 7ft. 7ins. as shown by sketch (not reproduced). I have written to the council on the question, but they will not bring it forward at any meeting; they simply ignore it. What action should I take? The owner of the new property has built his out-offices against the old property. Am I not right in thinking this is contrary to the by-laws?"

The letter of the by-laws has evidently been infringed in that the air-space at the rear of the new building should have a minimum width of 15ft. I am inclined to think you will find another clause in the by-laws from which you send an extract which allows the usual small out-buildings of a dwelling-house to be placed as shown in your sketch, but if there be no such clause there appears to be an infringement in this respect also. I gather from your query that you are objecting as being interested in the adjacent old building, but I fear that you have (practically) no remedy as against the urban district council, even though they have allowed their own by-laws to become of no effect. It is possible, however, that against the owner of the new building you have legal cause of complaint (1) if the out-buildings rest against your wall or form an encroachment on your property; (2) if he is obstructing any windows in the old building (which I presume is more than twenty years old). If neither of these is the case, I fear I do not realize how you are injured at all.

F. S. I.

PORTLAND CEMENT.

Its Constitution from a Physico-Chemical Standpoint.—II.

By CLIFFORD RICHARDSON.

(Concluded from p. 142, No. 501.)

FROM the preceding data it is evident that industrially we may have cements of different degrees of concentration as regards aluminates in the same way that steel exists of various degrees of concentration as regards carbon. As steel low in carbon is called a mild steel, and as there are cements corresponding to this in that they contain relatively small percentages of aluminates, these may be very well called mild cements. With increase of the amount of aluminate they may be called medium cements and with high aluminates hard cements. These designations it may eventually be necessary to modify to express variations in basicity.

Clinkers of Varying Proportions.

The question now arises as to how concentrated the solutions of aluminates in silicate may become before the clinker ceases to be a normal Portland cement. Series of clinkers were prepared in which the components were tri-calcic silicate and tri-calcic aluminate, the proportions varying between 100 per cent. of the one and none of the other to the reverse through various percentages, in order to determine what the limits for the formation of alit are under such circumstances; of tri-calcic silicate and di-calcic aluminate, to determine what effect a reduction in lime with a consequent increased formation of celit would have on the formation of alit, and consequently on the formation of a normal Portland-cement clinker; and a series in which the components were di-calcic silicate and di-calcic aluminate for the purpose of determining the limitations of the existence of celit. The first series may be called the "Alit Series," the second the "Cement Series," and the third the "Celit Series," for reasons that are readily understood.

A microscopic examination of thin sections of the clinkers constituting these series has furnished results of the greatest interest, but they are too elaborate to go into detail in regard to them in the present place. In a general way it may be said that the members of the celit series possess all the characteristics of celit, as it is seen in Portland-cement clinkers made from pure chemicals, up to about the molecular ratio of 6 of silicate to 1 of aluminate, $6(\text{SiO}_2\text{CaO}) (\text{Al}_2\text{O}_3\text{CaO})$; that at that ratio, or perhaps at a somewhat wider one, a solid emulsion begins to appear as part of the section; at the ratio 2 to 1, $2(\text{SiO}_2\text{CaO}) (\text{Al}_2\text{O}_3\text{CaO})$, the entire clinker consists of the solid emulsion, probably a eutectic, which begins to disappear again on the further concentration of the solution as regards aluminate, which phenomenon is accompanied by the appearance of cubes of the latter component before the ratio $3(\text{SiO}_2\text{CaO}) 2(\text{Al}_2\text{O}_3\text{CaO})$ is reached, while the cubes become very prominent in the concentration represented by $2(\text{SiO}_2\text{CaO}) 3(\text{Al}_2\text{O}_3\text{CaO})$ and still more so in $(\text{SiO}_2\text{CaO}) (\text{Al}_2\text{O}_3\text{CaO})$, these, of course, being solid solutions of the silicate in the aluminate. They naturally continue to increase as the concentration as regards silicate diminishes, but strangely possess a certain optical activity as if the dissolved silicate was not actually in solution in an isometric form, but was mechanically held in the isometric aluminate in its own orthorhombic form. The eutectic at this end of the series also seems to be present in a form other than that of an emulsion. In this series the solubility of the silicate in the aluminate is much greater than that of the aluminate in the silicate.

Quite a different condition is found in the cement series. Here the normal alit-celit

structure of two distinct solid solutions of different basicity is maintained up to the ratio $7(\text{SiO}_2\text{CaO}) 3(\text{Al}_2\text{O}_3\text{CaO})$, as has been described for the pure Portland clinkers, but when the ratio $2(\text{SiO}_2\text{CaO}) (\text{Al}_2\text{O}_3\text{CaO})$ is reached there is a decided change in structure, the solution assuming the emulsion form corresponding to that of the clinker of the ratio $2(\text{SiO}_2\text{CaO}) (\text{Al}_2\text{O}_3\text{CaO})$ of the celit series and having a higher general optical activity, but an absence of a distinct segregation of celit. This may provisionally be regarded as the eutectic of this series.

The Extent of Portland Cement and Hydraulic Limes.

The Portland cement ratio may, therefore, be regarded as extending from:—

	SiO_2	Al_2O_3	CaO
Pure tri-calcic silicate	26.4	0.0	73.6
$7(\text{SiO}_2\text{CaO}) 3(\text{Al}_2\text{O}_3\text{CaO})$	18.9	13.6	67.5

Beyond the latter degree of concentration the solutions or clinkers have not the structure of Portland cement and cannot be regarded as such, although they are hydraulic.

The eutectic in this series must be considered as consisting not of an emulsion of saturated solid solutions of one definite silicate in an aluminate of the same basicity and of the same aluminate in the same silicate, as in the celit series, but as of four solutions, viz., of tri-calcic silicate in tri-calcic aluminate, of tri-calcic aluminate in tri-calcic silicate, of di-calcic silicate in di-calcic aluminate, and of di-calcic aluminate in di-calcic silicate. This is a complicated situation, but the globulites containing the excess of the optically active silicates can be differentiated from those in which the aluminate is in excess by their brighter interference in polarized light.

Change as Proportions of Aluminate to Silicate Increase.

As the relative proportions of aluminate to silicate increase, $3(\text{SiO}_2\text{CaO}) 2(\text{Al}_2\text{O}_3\text{CaO})$, a crystalline element appears again with a diminution in the amount of the eutectic. The crystals, which theoretically must be a solution of the silicate in the aluminate, as in the similar ratios of the previous series, possess some optical activity and can hardly be distinguished from alit in form or optical activity. In the ratio $\text{SiO}_2\text{CaO}, \text{Al}_2\text{O}_3\text{CaO}$ they are very well formed and the emulsion is still further reduced in amount, at the same time being segregated again as groups like celit and having the optical activity of the latter. In the clinker in which the ratio is $6(\text{SiO}_2\text{CaO}) 4(\text{Al}_2\text{O}_3\text{CaO})$ the structure is again completely changed. The main part of the clinker is an emulsion with a segregation of cubical crystals of no optical activity. With continued decrease in the concentration as regards silicate the cubical crystals continue to increase and the optical activity to diminish. At the ratio $(\text{SiO}_2\text{CaO}) 6(\text{Al}_2\text{O}_3\text{CaO})$, corresponding to the reverse ratio of that for Portland cement at the other end of the series, the aluminate is first found segregated in the form of dendritic crystals constituting the larger part of the clinker, the material of higher freezing point still retaining some optical activity. The proportion of crystalline aluminate continues to increase on still further dilution as regards silicate, but a slight amount of optical activity remains in some particles with only 2 per cent. of silicate present.

In the alit series the alit form of the solution of tri-calcic aluminate in tri-calcic silicate persists through a wider range of concentration than in the two preceding series. The solutions present the low optical activity of alit and, in fact, consist of pure alit of different degrees of concentration. A eutectic is found in all concentrations that have been prepared beginning with the ratio $6(\text{SiO}_2\text{CaO}) (\text{Al}_2\text{O}_3\text{CaO})$, and the cubical crystals of aluminate only appear at

dilutions as regards silicate much greater than in the previous series, $2(\text{SiO}_2\text{CaO}) 8(\text{Al}_2\text{O}_3\text{CaO})$. Needle-shaped crystals are present, possibly a definite compound, at certain concentrations.

This series has yet to be studied closely, however; the only definite conclusions at present being that at least up to the ratio $3(\text{SiO}_2\text{CaO}) (\text{Al}_2\text{O}_3\text{CaO})$ it contains pure alit of different degrees of concentration and that tri-basic silicate and aluminate of lime are more mutually soluble in each other than the di-basic salts or mixtures of the salts of different degrees of basicity.

Further studies of the three series of solutions will be presented in another place in greater detail.

Not Miscible in Solid Solutions.

It is evident that basic silicates and aluminates are miscible in all proportions at sufficiently high temperatures, that is to say, in a fused condition, but that they are not thus miscible in a state of solid solution. In the latter condition this results in the formation of heterogeneous solid solutions such as have been found in the various members of the series which have been described. What the solubility of the basic compounds of iron and lime are, as well as of that of the magnesia salts, must be worked out later. It is known, however, that the iron compounds are not soluble to any extent in the basic lime silicates in the solid form. This, as will appear later, is an important fact in this connection, but it can hardly be taken up at this time with our limited knowledge of these solutions.

Diffusion.

Having determined that alit and celit are solid solutions of aluminates in silicates, the aluminates being present in less than an amount sufficient to make a saturated solution of aluminate in the silicate, it becomes of interest to consider how these solutions are formed during the conversion of a raw mixture or of a mixture of pure chemicals into a clinker. It would be simple to understand this if fusion took place in its formation, but this does not happen: the material is only sintered. If two gases are brought together, they diffuse into each other with very great rapidity. If two liquids are poured one upon the other in layers without mixing, they diffuse more slowly. If solids are brought into contact it would be naturally assumed that diffusion would cease. Experiments of Roberts-Austen have shown that molecular mobility in solids exists, since when carefully polished surfaces of gold and lead are brought into contact and left under pressure for some months, at the ordinary temperatures, gold is diffused into the lead and the lead into the gold for an appreciable distance. Mixtures of the components which will produce a fusible Wood metal when subjected to pressure at ordinary temperature become converted into this alloy. Anhydrous sulphate of soda and carbonate of barium also diffuse when brought into close contact with the formation of barium sulphate and carbonate of soda.

Sintering is Diffusion.

It is not difficult to understand, therefore, how at a temperature of 1,650 degs. C. the particles of silica, alumina and lime may diffuse below the melting point of the resulting clinker to form a Portland cement, and the fact that such a clinker is stable depends not only on its composition but upon the fact that the diffusion has been complete, even in material which is only sintered. Sintering, therefore, may be defined as diffusion at a temperature below the melting point of the components or of the resulting solid solution. That diffusion under such conditions is surprisingly rapid is seen by placing a particle of ferric oxide on the surface of white Portland-cement clinker and then submitting it to a moderately

high temperature. The rapid diffusion of iron through the white clinker can readily be noticed by the colour which spreads through the mass. It is evident that the higher the temperature the more rapid the diffusion until it becomes very rapid on fusion. From this it may be concluded that the length of time during which it is necessary to expose any mixture of silica, alumina and lime to a temperature is a function of the temperature, and should be longer the lower the temperature.

Surface Contact Area.

There is another condition, however, of great importance, and one which affects the rate of diffusion, and that is the area of surface of the different constituents which come into contact. Most investigators up to the time of the Newberrys were unable to prepare tri-calcic silicate or di-calcic silicate in a stable form. The Newberrys showed that if the materials silica and lime were finely enough divided there was no difficulty in forming a stable tri-calcic silicate. The writer has shown the same to be true in the case of the formation of stable di-calcic silicate.

Fick's Law.

This result is not unexpected if the law of physical chemistry known as Fick's Law is considered. From a study of salt solutions of different degrees of concentration Fick determined that the "amount of salt which diffuses through a given cross-section is proportional to the difference in concentration of two cross-sections lying infinitely near each other, or is proportional to the difference in cross-section" ("Elements of Physical Chemistry," Jones, p. 244). This law has been shown by several investigators to apply to metals, and no doubt applies to all solids.

Area of Contact in Particles.

If the surface area of the different particles entering into the formation of a clinker are not, therefore, great enough to provide a sufficient area of intimate contact for diffusion to be complete at the available temperature and in the allotted time, so that the resulting clinker is homogeneous in constitution, the latter will not be in equilibrium or volume-constant. This is a matter of great importance in the production of Portland cement, and, together with the temperature and duration of heating, makes up the conditions which must be carefully regulated in order to produce a stable clinker, that is to say, to bring about complete equilibrium without which a clinker on cooling will tend to rearrange its structure and dust.

Other Conditions resulting in Lack of Volume Constancy.

There are other conditions, however, which may cause instability in the solid solution. It can be readily imagined that as water in the case of many aqueous solutions may dissolve more of a salt at high temperatures, the silicate of lime may be able to dissolve more aluminate at high temperatures than will normally remain in solution in the cold. If such a solution is allowed to cool, the excess will separate out unless solidification is brought about so quickly as to prevent it. Should this take place the solid solution would be super-saturated, under appropriate conditions, and in a state of tension which would result in a tendency to return to equilibrium with a change of volume and breaking down of the clinker.

Effect of Difference in Temperature.

It can be readily imagined that such a state of affairs can exist in industrial Portland-cement clinkers which are rich in alumina. The conditions which aid in bringing about such a transformation are an increase in temperature, that is to say, the addition of heat. As in the case of hard steel, where heating it in different degrees, according to the temperature attained, results in withdrawing the temper, so we can

imagine that heating alit, which has been likened to the austenite of steel, may alter its structure. As a matter of fact, normal clinker when heated for some time to a red heat will not give a stable cement on grinding. Such a phenomenon as this may serve as an explanation of why cements change their rate of setting with age. A highly aluminous cement which, after plastering, will set in an hour has often been found to set in three minutes when stored in closed freight cars for some time in a hot summer's sun. Here the temperature of transformation has probably been reached, the tension in the solid solution has been released, with the result that some aluminate is liberated which makes the cement quick-setting again.

Fine Grinding of Raw Materials.

With cement of normal composition the finer the grinding of the raw mixture and the more thorough the burning the more complete the diffusion will be and the less tendency there will be toward a tension in the solid solution. As an illustration of this, the ordinary Lehigh Valley clinker will set rapidly when first made. If the same raw mixture is ground to a much finer and more impalpable powder and burned in the laboratory, a clinker is obtained which yields a cement which does not set in less than one hour immediately after it is made. At the same time, such very fine raw material can be burned at a temperature more than 200 degs. Fahr. below that required for the coarser industrial mixture, and if burned at the usual high temperature fuses quite readily.

Fineness an Element in Economy.

This leads to the conclusion that a proper balance between fineness of grinding and fuel expenditure must be arrived at in order to reach the greatest economy. In the United States, where fuel is cheap, a coarser raw mixture of the character of that found in the Lehigh Valley may be burned than would be the case in Germany, where fuel being dear, it would be cheaper to go to a greater expense for finer grinding. On this basis we arrive at the theoretical conclusion that if a very finely ground mixture was submitted to a very low temperature, say 500 degs. below that usually employed, for a very long time, say several weeks, the result would be as satisfactory a clinker as that now produced.

Dome Kiln v. Rotary Kiln.

It is probable that with the dome kiln the greater length of time of burning which is necessary is due to the fact that diffusion goes on much more slowly than in the rotary kiln and at a lower temperature. It also explains why that portion of the clinker dusts which has not attained as high a temperature as that in the hottest part of the kiln. Diffusion has not been complete and the solid solutions are not in equilibrium. The higher the percentage of lime the higher the temperature which is necessary to produce complete diffusion in combination with silica, and the greater the necessity for a large surface area of contact. The finer the grinding of the raw mixture the higher the percentage of lime which can be carried.

Composition no Guarantee.

It appears from the preceding that a proper chemical composition is no guarantee whatever that the cement will be a satisfactory one, as in such a case the materials of which it is composed may not have attained thorough diffusion and consequently not be in equilibrium.

Future Field of Investigation.

The points which have been brought out by the investigations which have been just described are suggestive, but can only be considered as showing the possibilities of what can be done in the future. There is, of course, a very large field for further investigation, including more particularly the

role which iron plays in the formation of clinker. There is no reason, however, why eventually the study of cements along physical lines should not afford as vast a fund of information as it has done in the case of iron and steel.

THREE NEW GLASGOW HOSPITALS.

A Total Cost of £500,000.

THREE newly-erected general and district hospitals were opened in Glasgow last Thursday. These comprise a large general hospital at Stobhill, to the north-east of Springburn Park; a district hospital in Duke Street, opposite the Cattle Market; a district hospital at Oakbank, near Garscube Toll; and a nurses' home within the grounds at Woodilee Asylum, Lenzie. The primary idea is to dissociate ordinary poor-house cases from those requiring active hospital treatment.

The Buildings at Stobhill

provide accommodation for 1,650 patients, 100 nurses and 70 servants, with houses for 20 workmen. The medical and surgical blocks are two storeys in height, having one large ward on each floor containing 26 beds, side room for one or two patients, a day-room, nurses' room, scullery and ambulance hoist. The minimum cubical size of these wards is 1,200ft. and the maximum 1,550ft. The four blocks for aged and infirm inmates are also two storeys in height. They have one large ward on each floor containing 28 beds, with side room for 2 beds, day-room and other accommodation. The isolation section, one storey high, is divided into three blocks—the administrative and two ward blocks. The wards are four in number and they contain four beds each; contents, 2,000 cub. ft. per bed. The children's section comprises thirteen blocks, all two storeys in height. There is also a school and a block providing for 100 children likely to be resident for only short periods. The whole of the buildings are of brick, with stone lintels and sills. The floors are of pitch-pine, laid directly on to concrete. For ventilation the foul air is carried away by pipes in the roofs and discharged through ventilators on the ridges, while the fresh air is brought in through openings in the windows and through stoves. The ventilators can be assisted by electric fans. Heating is by hot-water pipes and four grate-fires in each large ward. The site of this hospital comprises fifty-four acres and cost £8,300, while the buildings cost £299,836. Messrs. Thomson & Sandilands, of Glasgow, were the architects. In

The Eastern District Hospital,

which is situated in Duke Street, there is a total accommodation for 244 patients—133 male and 111 female. Wards are provided on the male side for 72 medical, 25 surgical and 7 skin cases, and on the female side for 36 medical, 25 surgical, 10 children, 7 skin and 4 maternity cases. There is also provision for 44 mental cases—22 male and 22 female. In addition there are two ward blocks for a due proportion of probationary and isolation cases, a fully-equipped operating theatre, mortuary, post-mortem room and pathological laboratory; also an administrative block, with the necessary offices and quarters for 30 nurses and 12 other members of the staff. Owing to the restricted nature of the site, great difficulty was experienced in obtaining the accommodation in a reasonable hospital form, and the architect (Mr. A. Hessel Tiltman, of London) had to adopt the somewhat unusual arrangement of wards radiating from a common centre. By this means he secured the maximum zone of aëration around each of the surgical and

medical ward blocks, with the resulting economy of corridors and staircases. In this hospital the architect has introduced many novel features, both in arrangement and appointment, some of them derived from the more recent German hospitals. The site and buildings cover an area of 8,429 sq. yds. and have cost £75,006.

The Western District Hospital

at Garscube Toll consists of eight distinct blocks, which, owing to the shape of the site, had to be arranged parallel to each other. The ward pavilions provide accommodation for 207 patients. The receiving block is divided into male and female wards of 3 beds each. The surgical pavilion is two storeys in height and is divided into four wards—two of 17 beds and two of 4 beds each. The smaller wards are meant for aseptic and septic cases. The medical block is three storeys high and is divided into twelve wards—six for 15 beds each, four for 3 beds each, and two isolation wards of 2 beds each, besides six side rooms of 1 bed each. The maternity and skin block provides on the ground floor the maternity wards and a female ward of 10 beds for skin diseases. The upper floor is intended for male cases of skin disease, and is divided into two wards of 10 beds each. The buildings and site cover an area of 7,198 sq. yds. and have cost £71,530. Mr. Alex. Cullen was the architect.

The nurses' home at Woodilee, together with a new pathological laboratory adjoining, has cost £17,398. The architect was Mr. W. Forrest Salmon, of Glasgow.

Construction Notes.

A Ferro-concrete Lighthouse.

A LIGHTHOUSE of ferro-concrete has just been constructed at Nicolaieff, near Odessa. The height is 131ft., the diameter at the base 28ft. and that at the top of the shaft 6ft. 7ins. The service-room, which is 14ft. 3ins. in diameter, is corbelled out, and thus overhangs 3ft. 10ins. on each side of the tower. For purposes of design the tower was considered as a tube firmly fixed at one end and acted upon by a distributed pressure, due to wind, of 56.4 lbs. per sq. ft. The foundation is sunk only 8ft. 3ins. below the surface of the ground. The skeleton consists generally of upright rods and of circular rings, the surrounding concrete being mixed in the proportion of 660 lbs. of Portland cement, 1 cub. yd. of ballast and half a cubic yard of sharp sand. In order to ensure that the concrete takes a firm hold of the framework the latter is brushed over with grout prior to the concrete being run in. It is claimed that a saving of 40 per cent. is effected by the use of the ferro-concrete. The weight of the structure is given as 453 tons, of which 342 tons only represent the weight of the ferro-concrete, whereas the weight of such a lighthouse put up in the ordinary way would be 1,343 tons. This important feature of combining lightness and strength will do much for the widespread use of ferro-concrete in engineering and building work. In an age when something new is always being discovered it is hazardous to prophesy, but there are innumerable indications that ferro-concrete will occupy a very important position among materials of construction in the future—say in the next decade.

Bricks from Clinkers.

LAST Wednesday a Local Government Board enquiry was held at West Hartlepool respecting the application by the Town Council for sanction to borrow £3,200 for the provision of buildings and plant for the manufacture of bricks from destructor clinker. Mr. N. S. Dennis, borough engineer, stated that the Corporation had between 800 yds. and 1,000 yds. of clinker for which they had no outlet at the present

time. It was estimated that on three years' working of the destructor there would be a surplus of over 3,000 tons of clinker for brick-making purposes, and this quantity would make 2,900,000 bricks. There were many important works in progress and contemplated in the town, and the Corporation proposed to use the clinker bricks in these works and sell the surplus. If properly manipulated the scheme ought not to entail any expense on the rates. Mr. Dennis submitted a sample brick manufactured at Leeds, and stated that a similar brick required 355 tons to crush it. The cost of manufacturing the bricks would be from 13s. 5d. to 14s. 6½d. per 1,000.

A Substitute for Lead Joints.

AN American inventor has introduced a new material for pipe joints. It has been given the name of "leadite" because it replaces lead for many ordinary uses. The chief ingredients are sulphur, brick-dust and sand, but various other materials are incorporated with these in varying proportions, according to the use to be made of the mixture. Some of the characteristics claimed for leadite are: It weighs 118 lbs. per cub. ft., or one-sixth the weight of lead; it melts at 310 degs. Fahr., while lead melts at 618 degs. Fahr.; it is a good non-conductor of electricity and is not affected by acid; it can be re-melted repeatedly without waste.

A New Process of Galvanizing.

HOT galvanizing is the process most extensively used to apply a zinc coating to iron and steel. Electro-zincing, or cold galvanizing, is used for special classes of work. A third method, called Sherardizing, has now been developed, and works have recently been completed for carrying it out on a commercial scale. By this new process iron and steel can be coated with a thin even deposit of zinc at a temperature below the melting-point of this metal. The first step in the process is to free the iron from scale and oxide by any of the well-known methods, such as dipping in an acid solution or sand-blasting. The articles to be rendered rust-proof are then placed in a closed air-tight iron receptacle (exhausted of air to prevent oxidation of the zinc) charged with zinc dust, which is heated to a temperature of from 500 degs. Fahr. to 600 degs. Fahr. for a few hours and allowed to cool. The drum is then opened and the iron articles are removed, when they are found to be coated with a fine homogeneous covering of zinc, the thickness depending on the temperature and the length of treatment. It will be observed that the temperature required to bring about this result is about 200 degs. below the melting point of zinc. The low temperature required makes the process cheap as compared with the process of dipping in molten zinc, and has the additional advantage that it does not deteriorate iron or steel of small section to the same extent as hot galvanizing. The whole of the zinc is consumed, and there is no waste of zinc as in the hot galvanizing process. This dry process of coating iron is not limited to zinc, but has been applied to coating iron with copper, aluminium and antimony, and to coating other metals with zinc, such as aluminium and copper. Copper and its alloys subjected to this process are case-hardened on the surface and can be rendered so hard as to turn the edge of a steel tool. The zinc powder used is the zinc dust of commerce, and is obtained during the process of distilling zinc from its ores. One of its peculiar properties is that it cannot be smelted or reduced to the metallic form under ordinary conditions even when heated to a very high temperature under considerable pressure, and this is advantageous in the new process of galvanizing as it does away with the risk there might be otherwise of melting the finely divided zinc through overheating of the furnace.

JUNIOR INSTITUTION OF ENGINEERS.

Summer Meeting in Germany.

LAST month's meeting in Germany of the Junior Institution of Engineers was a great success.

After visiting the Dusseldorf Exhibition and the great iron, steel and engineering works of the Gutehoffnungshutte at Oberhausen, the party inspected the Benrather Crane Works, which is one of the largest of its kind in Europe.

At Elberfeld they saw the Langen mono-rail suspended electric railway, where the carriages are hung and travel on an overhead rail which may be fixed at any level above ground or may be carried along the roof of a brick tunnel or iron tube. Another example is found at Loschwitz, near Dresden. The Elberfeld line has a length 8½ miles and has been in operation since March, 1901. It now carries about ten million passengers per annum. After thoroughly looking over this railway the party went to Messrs. Korting Brothers' works at Hanover, erected in the year 1871 and now giving employment to 2,500 hands: the chief products are gas-engines, appliances for steam users and manufacturers, pumps, boilers for steam and water heating, radiators, &c. The Korting ejector condenser is well known in England, more than fifty electric light and power stations being fitted with it. An interesting application of the spray nozzle was illustrated as it would be employed in cooling condenser water. It was also shown to be applicable for laying dust, purifying the air of public buildings, &c.

Having seen these works, the party visited the Hanover Engine Works, where the central electricity station with engines of 1,500-i.h.p. attracted special attention. The party then made their way to the Westinghouse Brake Co.'s works, and afterwards to the Hanover Gasworks, where they saw the Paris electro-turbine gas-retort charging machine. Leaving Hanover, the party went to Berlin. Here the electric overhead and underground railway and the works of Messrs. Siemens & Halske were inspected, also Mr. Pittler's experimental works, the Mariendorf gasworks of the Imperial Continental Gas Association, and the Royal Technical High School at Charlottenburg. At the Mariendorf gasworks a new holder was seen in course of erection, the whole of the side sheets being riveted by pneumatic riveters, air-compressing plant having been put down for the purpose.

The party left Berlin for Leipzig, whence they journeyed to Frankfort-on-Maine. At Frankfort, on the invitation of Mr. W. H. Lindley, M.I.C.E., an English engineer who has achieved great distinction on the Continent, the water and electricity works and the sewage works (all designed and carried out by him) were inspected. The arrangements made for these visits were most excellent and might well be followed in this country. Previous to the members going over each works, Mr. Lindley with the aid of diagrams and drawings gave a general description in the form of a short lecture. Members were thus in possession of the general characteristics of the undertaking and so in a much better position for seeking any special information having reference to their own branch of work. A fact elicited in the course of the visit which may not be generally known was that to Mr. Lindley is really due the introduction into Germany of the Parsons steam-turbine of large power.

An excursion to Homburg took place later, when the director of the baths conducted the party over the old and new buildings. The next day (August 27th) the party journeyed to Biebrich to join the Rhine express steamer for the trip to Bonn and thence by train to Cologne and so on to Flushing and England.

LIGHTNING CONDUCTORS.

Results of Recent Investigations.

SINCE its establishment by the Royal Institute of British Architects and the Surveyors' Institution a few years ago the Lightning Research Committee has investigated a large number of occurrences from the reports furnished by its observers, and many useful facts have thus been gathered together.

The principal causes of failure of the usual style of lightning rod as fitted on the buildings investigated appear to have been (1) an insufficient number of conductor and earth connections and (2) the absence of any system of connecting the metallic portions of the buildings to the lightning conductor, especially the interconnection of the finials, rainwater pipes and gutters. In the opinion of Mr. Killingworth Hedges, M.I.C.E., hon. secretary to the Committee, the frequent damage by side-flash might be lessened by running a horizontal conductor along the ridge or along the parapets of all the roofs, somewhat after the method which is almost universally adopted in Central Europe.

Three Classes of Strokes.

The lightning strokes recorded by the Committee's observers may be divided into three classes:—(1) Those where the conductor conveyed a portion of the flash to earth, but the side-flash to other unearthened metallic conductors damaged the building (the practice of running the conductor round the projecting masonry, often taking sharp bends, doubtless facilitated the deviation of the current from its direct path to the earth). (2) Those where in several observations a metallic roof of large area received the flash, consequently becoming highly charged, and the single conductor failed to convey the whole of the stroke—a portion of which took a circuitous path, as through a speaking-tube and an electric bell wire. (3) Those where a flash struck the building at two points simultaneously, a lightning conductor taking one part of the stroke, but damage being caused by the other portion selecting an unprotected part of the roof.

Earth Connections.

With a few exceptions, these had the defect common to nearly all earth-plates which are simply buried in the ground close to the foundations of a building and owing to drainage soon become dry, so that they are of very high resistance. Architects as a rule object to sufficiently deep holes being made near a structure; consequently the permanently moist ground is not reached. The tubular earth designed by Mr. Killingworth Hedges does away with this objection, and can be kept moist by leading a small tube to the nearest rainwater pipe.

Interconnection with the Metalwork of a Building.

Although the utility of the external metal was specially put forward in the report of the Lightning Rod Conference in 1882, their recommendation apparently has been disregarded in all the cases under review. The Cavendish Laboratory (No. 64) stroke, which was fortunately unattended with danger owing to the gas in the gas-pipe which formed the path of the current being turned off, would not have taken this circuitous path had the leaden roof been connected to the conductors which ran down the tower only, also to the rainwater gutter and pipes, which should have been interconnected at the bottom and properly earthed.

Again, at Bedford (No. 88) last year, St. Paul's Church was seriously damaged by the flash leaving the single conductor on the tower by the water on the roof and passing thence to earth by means of the rainwater

pipes. In this case it is interesting to note that the lead pipes were not fused, but their round section was changed into an oval one; the iron water-pipes were broken. This incident and No. 68 (St. Pancras Church, Euston) show clearly that the damage was due not to direct stroke but to a portion of the flash leaving the main conductor and taking a circuitous path round the unconnected metalwork outside and inside the buildings.

Vagaries of the Flash.

At Kea Church, Truro, the copper sheathing of the spire, owing to its great capacity, could not discharge through the one excellent conductor to earth, consequently the flash divided, part going by the conductor and part by the alternative path formed by the copper covering of the spire to a rainwater pipe, thence sparking through a parapet wall to lead flashing down another pipe, and then along a very small copper wire used for training plants to the main conductor. Similar effects were noted in Stoers Lighthouse (No. 54) and Devaar Lighthouse (No. 56), the divided flash in the former leaving the conductor for a telephone wire and in the latter for a speaking-tube. In these observations the conductors may be said to have acted to a certain extent, and if the structures had been entirely unprotected the damage would have been greater, but by proper attention to the necessities of each case and increasing the number of the conductors the risk would probably be nil, as there would be a definite path for the lightning to take.

The most Interesting Case

is that at Possingworth House (No. 67), struck in June and again in August, 1902, although the roof fairly bristled with air terminals, every chimney being protected, mostly with its own conductor and earth connection. It is probable that on the second occasion the flash divided, one part selecting a chimney stack, which it damaged, bending the air terminal to an angle of 45 degs., while the other, neglecting the many points, fell on an unprotected statue much lower than the chimney and went to earth by the iron frame of a conservatory, showing the unreliability of a number of independent conductors which should have been interconnected by means of a horizontal wire led along the ridge; this in all probability would have prevented any serious damage.

Hot Air as a Conductor.

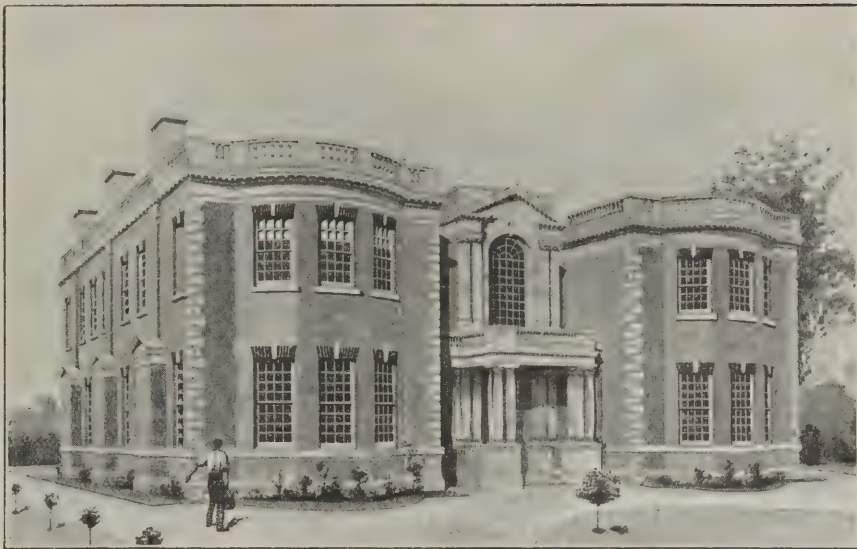
Sir Oliver Lodge has shown by an interesting experiment that a column of hot air is

often selected by a flash although a lightning rod may be affixed to the side of the chimney. Most of our large stacks have a band of metal to which the air terminals are fitted, and from these two conductors should be led to earth. The method adopted in Germany appears to be simpler, consisting of a heavy iron frame rising to a sufficient height above the stack, and continued at the apex so as to form an aigrette. That lightning may prefer the smoke issuing from a chimney was shown by the stroke at the East London Waterworks, Sunbury, last year, the flash doing some damage to the capping before it arrived at the standpipe inside, which was a perfect earth, in that it was directly connected with the company's mains.

The General Conclusions

arrived at by Mr. Killingworth Hedges are that there is very little advantage in placing isolated rods on an ordinary building unless it has a high tower. A church, for instance, with a spire should have at least two conductors from top to earth. Even then, if any other part of the structure happens to be in the path of a discharge from a cloud to the ground, the stroke may disregard the protected towers or spire and fall on the building, choosing some lower point. If the suggestion put forward by Sir Oliver Lodge at the Bath meeting in 1888 were more closely followed, and the conductors so arranged that they form a protective network over all the roofs, a flash would in all probability be received by some portion of the system and pass without harm to the ground by one of the numerous earths to which the network would be connected.

The insurance offices appear to disregard the question of adequate protection, and are quite content if the single conductor which has not prevented serious damage, for instance, to a church, is replaced, and, moreover, they take no steps to have the earth connection tested periodically. The few unconnected lightning rods erected on our national museums, picture galleries, and other public buildings contrast most unfavourably with the more scientific methods adopted on the Continent, more especially in Germany, where in some districts the local authorities have issued rules as to the erection and testing of lightning conductors, to which the various public bodies have to conform, and in some cities householders are subject to penalties if the system is allowed to get out of order.



PROPOSED GEORGIAN MANSION IN WARWICKSHIRE. CHARLES M. C. ARMSTRONG, ARCHITECT.

On the ground floor there is provided a billiard-room to the right of the entrance hall, with the drawing-room to the left, a large hall beyond the entrance hall, and dining-room with corridor to kitchen and offices. Over the entrance hall is a library.

MODERN LONDON BUILDINGS.

(Continued from p. 33, No. 467.)

N.E. DISTRICT: RELIGIOUS BUILDINGS.

BUILDING.	ARCHITECT.	APPROXIMATE COST.	REMARKS.
1875. Hamburger Lutheran Church, Dalston - - -	—	£ 10,000	For the use of patients of the German Hospital, which it adjoins.
1876. St. Agatha's Church, Shoreditch - - -	—	2,500	In the Early English style. Accommodates 300 worshippers.
1889. Holy Trinity, Old Nichol Street, Bethnal Green - - -	R. J. Lovell	—	Church is on first floor, ground floor being occupied by a club-room.
1890. Citadel Buildings for the "Salvation Army," High Street, Walthamstow.	J. Williams Dunford.	4,500	Accommodation for 1,000 persons; six large shops.
1891. St. Matthew's Parish Church, rooms, Clapton - - -	Arnold Mitchell	—	
1892. St. Margaret's Church, Harr w Green, Leytonstone - - -	J. T. Newman & Jacques.	7,000	Thirteenth-century Gothic style, of brick, with accommodation for 821 persons.
1893. Church, Hainault Road, Leytonstone - - -	Richard Creed	7,000	Of local bricks faced with Weldon stone. Accommodation for 600 persons.
1897. New Church, Leytonstone - - -	William Wallace	4,200	Length 79ft., width 37ft., increased to 60ft. between transepts. Accommodation for 496 persons.
Synagogue and Classrooms, Devonshire Road, South Hackney.	Delissa Joseph	8,000 (including site).	On a lower ground floor are nine classrooms and an assembly hall accommodating 400 children. The main floor of the synagogue accommodates 340 males, and the galleries 210 females.
Wesleyan Church, Church Hill, Walthamstow - - -	Gordon, Lowther & Gunton.	5,700	Accommodation for 600 persons. Schools adjoining for 450 children.
1900. Mission Hall Buildings of St. Mark's Church, Victoria Park, Hackney.	C. E. Hewitt	—	
1901. Parochial Buildings, St. James-the-Less, Bethnal Green - - -	E. Hoole	16,000	The buildings consist of schools and a hall for 1,000 persons, also a gymnasium.
1902. Congregational Chapel, Broadway, Victoria Park - - -	P. Morley Horder	—	Accommodation for 800 persons; the school adjoining for 300.

N.W. DISTRICT: PUBLIC BUILDINGS.

1875. Harrow Public Hall - - -	C. F. Hayward	£ 3,000	The building measures 56ft. by 37ft., and is 24ft. high to the cornice.
1876. Marylebone Parochial Offices - - -	H. Saxon Snell	5,900	The building is in rusticated Portland stone.
1878. Hampstead Vestry Hall - - -	Kendall & Mew	—	
1879. Public Baths, Whitfield Street, St. Pancras - - -	H. Gundry	35,000	Larger bath 90ft. by 28ft., smaller bath 55ft. by 24ft. In Moorish style with pendentive dome.
1881. Turkish Baths, Camden Town - - -	H. H. Bridgeman	—	
1882. North London Consumptive Hospital, Mount Vernon, Hampstead.	T. Roger Smith	—	Early French Renaissance in style. Accommodation for 100 patients.
1883. Euston Station Building - - -	— Stansby, Co.'s Architect.	30,000	Connects the Euston and Victoria Hotels. Façade is of Portland stone. 222 bed- and sitting-rooms.
1884. St. Pancras Workhouse (additions) - - -	H. H. Bridgeman	57,475	
1885. L. & N.W.R. Buildings, Euston - - -	— Stansby, Co.'s Architect.	20,000	The Drummond Street frontage is in rusticated Portland stone.
1886. Hampden House Residential Club, Hampden Street - - -	E. G. Salter	—	
1887. Hampstead Infirmary (Circular Ward Block) - - -	Charles Bell	10,400	Five floors, containing 88 bedrooms; also reading-room, grill- and dining-rooms, &c. Contains 72 beds on three floors, with 24 beds in each ward. Height of wards 13ft. and 12ft., diameter 50ft.
1888. Lecture Hall for Artizans', Labourers' and General Dwellings Co., Queen's Park, Harrow Road.	Rowland Plumble	—	Marks the completion of the estate. The buildings, to house 2,300 persons, were commenced in 1876 and erected at a cost of £700,000
1889. Madame Tussaud's, Marylebone Road - - -	J. W. Hunt	—	Frontage 400ft., depth 60ft. Marble staircase supported by caryatides, modelled on those in the Louvre.
1890. St. Pancras Workhouse Extension, St. Pancras Road - - -	H. H. Bridgeman	30,448	Five storeys high, one comprising administrative offices and the others wards (80ft. by 40ft.).
1891. Bickersteth Memorial Hall, White Bear Green, Hampstead	Wilfred T. Hardcastle.	2,000	The hall seats 300 persons.
1892. Marylebone Infirmary, Nurses' Home - - -	H. Saxon Snell & Sons.	—	Three storeys high, containing forty rooms, each 14ft. by 10ft.
1893. Mortuary, York Court, Marylebone - - -	H. Saxon Snell & Sons.	3,131	
1894. Public Baths, Finchley New Road - - -	Spalding & Auld	17,500	Two swimming-baths for men, each 100ft. by 35ft., and one for ladies, 56ft. by 25ft.
1895. Artists' Volunteers' Headquarters - - -	Colonel R. W. Edis	6,500	Over the entrance is a large medallion by Mr. Brock. The drill hall is 100ft. by 52ft.
1896. Cripples' Home, Marylebone Road - - -	Habershon & Fawckner.	9,000	Accommodation for 100 inmates.
1897. Hospital for Women, Euston Road - - -	J. M. Brydon	—	Accommodation for 42 beds in two rectangular wards 42ft. by 26ft. (474 cub. ft. of air-space per bed), also two circular wards 35ft. diameter, and private wards.
1898. The Samaritan Free Hospital, Marylebone Road - - -	Habershon & Fawckner.	12,000 (First contract).	Initial accommodation for sixty beds, to be increased to 100 beds.
1899. Swimming bath for ladies, Hampstead Public Baths - - -	Spalding & Cross	8,690	The bath measures 90ft. by 34ft. There are forty-seven dressing-boxes.
1900. North London Hospital for Consumption, Mount Vernon (additions).	Roger Smith, Son & Gale.	—	Central block accommodates thirty extra patients. The basement floor of this portion contains the chapel, dispensary, out-patients' department, &c.
1901. Willesden Cottage Hospital - - -	Newman & Newman.	2,000	Four beds in the male ward and four in the female. Wards 20ft. by 18ft.
1902. L. & N.W.R. additions to Willesden Junction and Euston Stations.	—	60,000	At Willesden Junction a railway bridge for Broad Street trains, together with platforms, &c. At Euston a steel bridge 150ft. by 26ft.; also a general reconstruction of a large portion of the station.
1903. North-Western Hospital - - -	Pennington and Son.	43,500	Five two-storeyed pavilions for fever cases and one block for isolation cases.
1904. Willesden Board Offices, Public Library, Fire-Brigade Station and Mortuary, Kilburn.	Edmeston & Gabriel.	—	Accommodation for 226 patients. Library has lending department 40ft. by 25ft. and reading-room 40ft. by 30ft.
1905. Casual Wards, Kentish Town - - -	A. & C. Harston	11,000	The wards accommodate 48 males, 18 females and 6 children. Frontage to Holmes Road 125ft.
1906. Hampstead Public Library, Arkwright Road - - -	Arnold S. Tayler	4,954	Reference library 50ft. by 30ft. Furniture in teak from architect's designs.
1907. Hospital of St. John and St. Elizabeth, St. John's Wood - - -	E. Goldie	—	Comprises a church and a hospital for incurables, the church being in the centre and the ward blocks on either side.
1908. Marylebone Workhouse (Additional Ward Blocks) - - -	A. Saxon Snell	52,100	The additional buildings consist of two large double-ward blocks, connected on the ground floor and basement. There are 555 beds for old and infirm men, eleven for male and ten for female imbeciles, and three for male and three for female lunatics.
1909. Public Baths and Washhouses, Finchley Road (rebuilding) - - -	Spalding & Cross	8,995	There are 4 swimming-baths and 24 slipper baths.
1910. Kilburn Palace of Varieties, Belzize Road - - -	Palgrave & Co.	—	Proscenium opening 30ft. wide, stage 64ft. with a depth of 31ft.
1911. Camden Theatre, High Street, Camden Town - - -	W. G. R. Sprague	50,000	The auditorium accommodates 3,000 persons.

BUILDING.	ARCHITECT.	APPROXIMATE COST.	REMARKS.
1900—cont.			
Euston Theatre of Varieties, Euston Road - - - -	Wylson & Long	£ —	Auditorium 55ft. by 62ft., and 60ft. high. Stage 47ft. deep and 51ft. wide. Proscenium opening 30ft. wide.
Portman Market, Church Street, Marylebone - - -	Gordon & Gunton	—	Provides 175 stands, stalls, hanging spaces and offices: 4,553ft. devoted to cold storage.
Public Library, West Hampstead - - - - -	Charles H. Lowe	3,000	The reference library is 31ft. by 19ft. and the news-room 31ft. by 20ft.
St. Pancras Public Baths and Washhouses, Kentish Town - - -	J. W. Aldwinckle	95 030	Four swimming-baths (two for men and two for women), 130 slipper baths, and a public washhouse with fifty washing compartments.
Willesden Court House - - - - -	Wakelam	—	There are two courts, with rooms for magistrates, chief clerk, &c.
1901.			
Drill Hall, Hendon - - - - -	Nowell, Parr & Kates.	2,540	Drill hall 90ft. by 45ft. providing accommodation for two squadrons.
Fire-Brigade Station, Euston Road - - - - -	W. E. Riley	14,377	The engine-room is 39ft. by 33ft. At the rear are stables for six horses.
1902.			
Crematorium, Golder's Green, Finchley - - - - -	Ernest George & Yeates.	—	The style is that of the brick buildings of Northern Italy. The chapel measures 70ft. by 20ft., and has at one end a raised dais on which is the marble catafalque.
Fire-Brigade Station, West End Lane, West Hampstead - - -	W. E. Riley	14,000	The columbarium is a tower-like building of four storeys, around the walls of which are niches to receive the urns.
Public Library, Cotleigh Road, West End Lane - - -	C. H. Lowe	2,400	Four sets of quarters for men in cottages at rear. Stabling for four horses.

Keystones.

Mr. John Begg is now in this country making an investigation into hospitals on behalf of the Government of India.

The rebuilding of St. George's Hospital, Knightsbridge, is to be undertaken by Mr. H. Percy Adams, F.R.I.B.A. The cost is likely to be £300,000.

The Alhambra, Gateshead, is to be built at the corner of Sunderland Road and High Street. Mr. Stuart S. Mould is the architect and Mr. James Johnson, of Boldon, the builder.

South-Western Polytechnic (Manresa Road, Chelsea, S.W.).—Prospectuses of the day and evening classes for the next session have just been issued. Mr. Banister F. Fletcher, F.R.I.B.A., is the lecturer in architecture. Classes begin on September 26th.

A new Coastguard Station and Naval Reserve Battery at Sunderland has been built by Mr. S. Warburton, of Manchester. It comprises a block of houses for the accommodation of the coastguard, a battery, a drill shed and stores; there is also a large drill ground.

The A.A. Winter Term begins on September 26th. The evening continuation school has been established to carry on the work of the day school for a third and fourth year, thus covering the usual period of a pupil's articles. Mr. T. Frank Green, A.R.I.B.A., is the master.

Competition for Carnegie Library at Benwell, Newcastle.—The conditions in this competition are causing considerable dissatisfaction among Newcastle architects. The premiums offered are £75, £40 and £25, but it is stipulated that the premiated plans are to become the property of the urban district council.

Associated Portland Cement Manufacturers (1900), Ltd.—The report for the year ended June 30th states that the profits, after deductions which include £135,592 for repairs and renewals, amount to £335,721, making with the amount brought forward £342,693. After deducting charges, including sinking funds, depreciation and reserves, £27,806, and bad debts reserve, £4,000, there remained £161,543. It is proposed to carry £25,000 to the general reserve and depreciation account, and to pay a final dividend on the preference shares at the rate of 5½ per cent. per annum, leaving £17,658 to be carried forward. No dividend however is recommended for the ordinary shareholders. Owing to competition, which the depression of trade has intensified, the selling price of cement has again fallen, while the higher price of coke has made fuel dearer. The rotary kilns at Swanscombe and Arlesey have been working satisfactorily and have produced an increased tonnage at a reduced cost. The largest of the Northfleet works has been equipped with a similar plant, and favourable results are anticipated on the current year from all these installations.

A Memorial to Mr. John Kensit is to be erected in London at an early date. It is to take the form of a training home for the Wycliffe preachers.

A Stained-Glass Window by Mr. Selwyn Image has been erected in the church at Cury, Cornwall, by the Hon. Sir Langdon Bonython, member of the Federal Parliament of Australia.

Vanishing London.—Harcourt House, the gloomy mansion which has occupied the centre of the west side of Cavendish Square for nearly two hundred years, has been sold "without any restrictions on the purchaser." It was built by Lord Bingley in 1722-3.

Birmingham Municipal School of Art.—The session 1904-05 began on September 12th. A supplementary programme of classes in architecture, building construction, quantities, &c., has been issued. This section of the school is especially well represented. On Thursday last Mr. W. H. Bidlake, A.R.I.B.A., gave the first of a course of lectures on architecture.

New Headmaster's House, Upper Latymer Foundation, Hammersmith.—The limited competition for this building has just been decided by the Governors in favour of the design prepared jointly by Mr. W. I. Chambers, of Chambers & Martin, 2, Lancaster Place, Strand, and Mr. J. H. Brown, of Fulham, and the contract has been entrusted to Messrs. Frank Harris & Co., of Albion Works, Barnsbury.

Revolving Houses.—Two Frenchmen, Dr. Pellegrin and M. E. Petit, a Paris architect, have designed a method of erecting houses on rotating platforms so that they can be given any required aspect. The platform is supported on two concentric walls, the inner chamber so made containing a stairway, and the axis of rotation is occupied by a shaft through which pass the supply and waste pipes of the house. A gas or petrol engine is employed to move the platform.

Prizes for Drawings offered by the L.C.C.—The London County Council offers two prizes of £15 each, two of £10 each and two of £5 each for drawings of buildings, churches, and of artistic objects in museums (South Kensington Museum and the British Museum especially). All the drawings should be of Imperial size or mounted (two or more together) on sheets of that size. The aim should be to represent the objects as faithfully and carefully as possible, and no mere sketches will be accepted. The sets which receive prizes will become the absolute property of the Council. Candidates must be resident within the county of London and be students in schools which are maintained or aided by the Council. They must apply on forms which may be obtained from the clerk of the Council, Spring Gardens, S.W. The last day for sending in drawings—to the L.C.C. Central School of Arts and Crafts, 316, Regent Street—is Tuesday, November 1st.

An Isolation Hospital at Barnet is to be built at a cost of £8,000. In competition, the design of Mr. J. Hugh Goodman, of Reading, has been selected.

The Baptist Sunday School at Slaithwaite is being enlarged and rebuilt according to the plans of Mr. Joseph Berry, architect. Messrs. Eagland & Sons, Ltd., are the builders.

A Mosque for London is proposed to be erected to accommodate 2,000 Mohammedans. It will have a minaret 200ft. high. Mr. Robert Williams, F.R.I.B.A., of Clifford's Inn, is the architect.

A new Y.M.C.A. Building at Dale End, Birmingham, is being completed from the designs of Messrs. Ewen & Alfred Harper, architects, Birmingham. Mr. William Bishop, of King's Heath, is the contractor.

Chichester Cathedral Alterations.—The work of pulling down the old reredos in Chichester Cathedral was begun last week, and in due course it will be removed to St. Saviour's Church, Brighton. This is only one of several works now being carried out by Messrs. Vick at the cathedral, others including the repair of the bell tower, the re-erection of the tomb of St. Richard in the south transept, and the setting-up of the old Arundel screen on the ground floor of the bell tower.

The Church of St. Leonard, Sherfield English, near Romsey, has been rebuilt at a cost of £10,000 from designs by Mr. Fred Bath, F.R.I.B.A., F.S.I., of Salisbury. Most of the building work was carried out by Messrs. W. Roles & Sons, of Romsey, who later transferred their contract to Messrs. Jenkins & Sons, Ltd., of Southampton and Bournemouth. The church is Gothic in style and seats 180 worshippers. Messrs. Harry Hems & Sons, of Exeter, have executed the carving.

Restoring St. Bartholomew's Cloister.—The work of restoring the ancient cloister of St. Bartholomew-the-Great, Smithfield, is about to be commenced. For years the cloister has been used as livery stables, with dwelling-rooms above. It comprises three bays, the total length being 45ft. and the width 15ft. At present the bases of the clustered columns are covered with nearly 8ft. of earth. Years ago the vaulting—formed of chalk and rubble, with stone groins—was destroyed, but an arched Norman doorway in the belfry tower which formed the approach to the cloister is still in existence and will eventually be reopened. The church was founded by Rahere in 1123, but the cloisters only date back to the fourteenth century.

Ruskin Museum, Meersbrook Park, Sheffield.—The annual report states that 47,357 persons visited the museum during the past year. An additional cast of the series taken under Ruskin's supervision of

the decorative work of the Acanthus Arch of St. Mark's Cathedral, Venice, has been mounted in a suitable case and placed in the gallery. The Sheffield Ruskin Club is now discussing "The Seven Lamps of Architecture."

A new building for the Scottish Amicable Life Assurance Society has been erected at the corner of Cross Street and John Dalton Street, Manchester, from designs by Messrs. Charles Heathcote & Sons, of Manchester. It stands on the site of De Quincey's birthplace, latterly known as the "Prince's Tavern."

At the corner of Newgate Street and Cheapside a new block of business premises has been erected. It is of five floors and is surmounted by a dome resting on an octagonal base, the two lower floors comprising plate-glass windows and thin bronze angle-bars! Mr. Delissa Joseph, F.R.I.B.A., was the architect, Messrs. L. Whitehead & Co., Ltd., were the contractors, and Mr. Gilbert Seale executed the carving, which includes a life-

size caryatid below an oriel window. The building is of Portland stone.

A new Synagogue at Belfast has been erected at a cost of £3,000. The seats are arranged so as to face the reader's platform, which is octagonal on plan, and was formerly used in the old synagogue. Accommodation is provided for 300 persons on the ground floor, with a gallery holding 200 in addition. Above the vestibule is a minor hall approached from the gallery staircase. All the windows are filled with lead lights by Messrs. Ward & Partners. The internal woodwork is principally of pitch-pine, varnished. Messrs. Musgrave & Co., Ltd., have installed their low-pressure system of heating. The electric lighting has been done by Messrs. Smith & Parkes. Mr. John Dowling has carried out the plumbing work. Messrs. James Henry & Son, of Belfast, were the contractors and Messrs. Young & Mackenzie the architects, while Mr. B. S. Jacobs, of Hull, acted as consulting architect.

The Carmarthen County Jail was built in 1789-1792. Nash was the architect and he took his designs as approved by John Howard, the philanthropist.

The King's Theatre, Glasgow, has just been completed at the corner of Bath Street and Elmbank Street from the designs of Mr. Frank Matcham, of London. The stage is 70ft. wide and 50ft. deep. Messrs. M'Gilvray & Ferris, of Glasgow, have carried out the decoration of the auditorium (from the architect's drawings) in fibrous plaster.

King's College, London: Architectural School.—The syllabus of the day and evening classes at this school has just been issued. The Michaelmas term begins on Wednesday, October 5th. Mr. R. Elsey Smith, A.R.I.B.A., is the professor and Messrs. Arthur Stratten, A.R.I.B.A., & James Bartlett, M.S.A., are the lecturers, with Mr. Ronald P. Jones, M.A., as assistant lecturer. The full course for matriculated students extends over three years.

Complete List of Contracts Open.

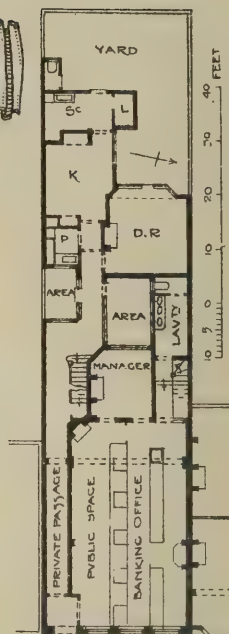
DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Sept. 22	Abergavenny, Mon.—Building	Monmouthshire Asylum Committee of Visitors.	E. A. Johnson, St. Mary's Chambers, Abergavenny.
" 22	Bristol—School Enlargement	Education Committee	Peter Addie Council House, Bristol.
" 22	London, E.—Builders' Work	Mile End Old Town Guardians	Clerk to Guardians, Guardians' Offices, Bancroft Road, E.
" 22	Portland—Erection of Stores	Co-operative Society, Ltd.	W. Edwards, Secretary, 26 Reforme, Portland.
" 22	Camborne, Cornwall—Five Cottages	Cornwall Laundry Co., Ltd.	H. W. Collins, Architect, Clinton Road, Redruth.
" 22	Hatton, near Warwick—Building Materials	County Lunatic Asylum	County Lunatic Asylum, Hatton.
" 23	Llandrindod, Wales—Presbyterian Chapel	Admiralty	W. B. Rees, Architect, 37 St. Mary's Street, Cardiff.
" 23	Tol-pedn-penwith, near Land's End, Cornwall—Coastguard Buildings.		Superintending Civil Engineer, H.M. Dockyard, Devonport.
" 23	Dymchurch, Kent—Coastguard Buildings		Director of Works Department, Admiralty, 21 Northumberland Avenue, W.C.
" 23	Cork—Rebuilding Engine and Pump House	Town Council	City Engineer, Municipal Buildings, Cork.
" 23	Egremont Cumberland—Alterations, &c., to Shop	Industrial Co-operative Soc., Ltd.	W. G. Scott & Co., Victoria Buildings, Workington.
" 23	Fraserburgh, N.B.—Library		W. S. F. Wilson, 6 Broad Street, Fraserburgh.
" 24	Skipton—Additions to Works	Wright Brothers	James Hartley, Architect, Skipton.
" 24	Tamworth—Two Cottages, &c.	Rural District Council	J. W. Godderidge, Bolebridge Street, Tamworth.
" 26	Altrincham—Swimming Bath	Urban District Council	Offices of Council, Town Hall, Altrincham.
" 26	Dalney, N.B.—Cottage		P. Fulton, Architect, Forres.
" 26	Great Dunmow, Essex—Isolation Hospital	Rural District Council	C. & W. H. Purtswee, Architects, Chelmsford.
" 26	Kington-on-Thames—School	Education Committee	F. W. Roper, 9 Adam Street, Adelphi, W.C.
" 26	Tara Hall co. Meath—Repairs		J. F. M'Gahan, 3 Earl Street, Dundalk.
" 26	Newport, Isle of Wight—Additions and Alterations to Schools	Borough Education Committee	F. D. Shields, 16 Quay Street, Newport.
" 26	Liverpool—Post Office	Commissioners	Cropper, H.M. Office of Works, G.P.O., Liverpool.
" 27	Tipton—Library Buildings	Urban District Council	W. H. Jukes, Public Offices, Tipton.
" 27	Llangollen—Alteration, &c., to Market Hall and Assembly Rooms.	Urban District Council	Surveyor, U.D.C., Llangollen.
" 27	Holbeck, Leeds—Sorting Office	Commissioners	H. G. Nixon, H.M. Office of Works, Infirmary Street, Leeds.
" 27	Moss Side, Manchester—Public Baths	Urban District Council	H. B. Longley, Engineer, Council Offices, Moss Side.
" 28	Leigh, Lancs.—Municipal Buildings	Corporation	J. C. Prestwich, Bradshaw Gate Chambers, Leigh.
" 28	Belfast—House and Shop		I. Houston, Kingscourt, Wellington Place, Belfast.
" 28	Blaenycwm, Wales—Fifty-five Houses, &c.	Hendrewen Building Club	W. D. Morgan, Victoria Chambers, Pentre, Glam.
" 28	Bridgwater, Somerset—Mortuary	Guardians	W. A. Collins, 120 West Street, Bridgwater.
" 28	London, N.—Chapel	Guardians, Edmonton Union	T. E. Knightley, 106 Cannon Street, E.C.
" 29	Southwark, S.E.—Building Area	Guardians	G. W. Stevenson, 13 and 14 King Street, E.C.
" 30	Poole, near Fowey—Coastguard Buildings	Admiralty	Superintending Civil Engineer, H.M. Dockyard, Devonport.
Oct. 3	Napsley, near St. Albans—Cottages	County Council	Young & Brown, 104 High Holborn, W.C.
" 3	Erith, Kent—Car Sheds, &c.	Urban District Council	W. Egerton, 12 Queen's Road, Erith.
" 3	Ireland—Houses	Great Northern Ry. Co.	W. H. Mills, Amiens Street Terminus, Dublin.
" 4	Chatham—School	Education Committee	H. A. Dunstall, Bank Chambers, Railway Street, Chatham.
" 4	Edinburgh—Washing Hall, &c.	Corporation	Public Works Office, City Chambers, Edinburgh.
" 5	Poplar—Public Library	Council	J. R. Hunt & Co., Bridge House, 181 Queen Victoria Street, E.C.
" 5	Wandsworth—Alterations, &c., to School	Guardians	C. A. Sharp, 11 Old Queen Street, Queen Anne's Gate, S.W.
" 8	Birkenhead—Laundry Buildings, &c.	Guardians	E. Kirby, 5 Cook Street, Liverpool.
" 12	Chingford, Essex—Extension to Hospital	Walthamstow U.D.C.	G. W. Holmes, Town Hall, Walthamstow.
" 31	Wallasey—Public Offices	Urban District Council	H. W. Cook, Public Offices, Egremont, Cheshire.
No date	London, S.W.—Erection of Block of Shops		Palgrave & Co., Architects, 28 Victoria Street, S.W.
"	Leamington—Alterations, &c., to Hotel		Brown & Barrow, 12 Norfolk Street, Strand
"	Walham Green—Pulling down Old Buildings		W. H. Gibbs & Co., 2A New Broadway, Ealing, W.
ENGINEERING:			
Sept. 22	Bude, Cornwall—Gates	Stratton and Bute U.D.C.	R. A. Foster-Melliar, Council Offices, Bude.
" 22	Nelson, Lancs.—Waterworks	Water Committee	James Hartley, Waterworks Manager, Town Hall, Hartley.
" 23	Ingleton, Kirkby Lonsdale—Lighting	Parish Council	J. W. Tate, Clerk to Council.
" 24	Howden, Yorks—Lifting	Parish Council	W. H. Blackburn, Chairman to Council, Howden.
" 24	Bamford, near Sheffield—Sluice Valves	Derwent Valley Water Board	E. Sandeman, Bamford, near Sheffield.
" 24	Stroud—Waterworks Extension	Water Committee	Manager, Water Co., John Street, Stroud.
" 26	Hamilton, N.B.—Hothouse	Parish Council	J. B. Brodie, 136 Wellington Street, Glasgow.
" 26	Christchurch—Reconstruction of Bridge	County Council	J. W. Taylor, Surveyor, The Castle, Winchester.
" 26	Ilford—Heating and Lighting	Urban District Council	C. J. Dawson, 12 Cranbrook Road, Ilford.
" 26	Sunderland—Joist Gearing	River Wear Commissioners	H. A. Wake, Engineer's Office, Commissioners' Quay, Sunderland.
" 27	Aberdeen—Car Tops	Tramways Committee	J. A. Bell, Electrical Engineer, Electricity Works, Milburn Street, Aberdeen.
" 27	London, N.—Electricity Works	Edmonton U.D.C.	W. F. Payne, Clerk, Town Hall, Edmonton.
" 28	London, E.C.—Goods Wagons, &c.	Burma Ry. Co., Ltd.	Company's Office, 76 Gresham House, Old Broad Street, E.C.
" 28	Chorley—Hot-water Installation	Guardians	Jolly & Buckley, Architects, Chorley.
" 28	Bangour, N.B.—Electric Wiring, &c.	Edinbro' District Lunatic Board	H. J. Blanc, 25 Rutland Square, Edinburgh.
" 30	Tynemouth—Dynamo	Corporation	C. Turnbull, Electrical Engineer, Elec. works, North Shields.
" 30	Cudworth, Yorks—Liquefying Tanks, &c.	Urban District Council	Fairbank & Son, Lendal Chambers, York.
Oct. 4	London, S.W.—Plant	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
" 4	London, S.W.—Pumps, Motors, &c.	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
" 4	London, W.—Reconstructing Bridge	London County Council	Maurice Fitzmaurice, County Hall, Spring Gardens, S.W.
" 4	London, S.W.—Electric Car Traversers	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
" 4	London, S.W.—Condensers, Piping, &c.	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
" 5	Mortlake—Pumping Machinery	Richmond Main Sewerage Board	W. Fairley, Engineer to Board, West Hall Road, Kew Gardens.
" 5	Portnoo, co. Donegal—Pier	Board of Public Works	H. Williams, Office of Public Works, Dublin.
" 7	Cladnageragh, Ireland—Timber Jetty		H. Williams, Secretary, Office of Public Works, Dublin.
" 10	Ludlow—Sewage-disposal Works	Town Council	J. H. Williams, Town Clerk, Ludlow.
" 10	Pontypridd—Steam Motors	Urban District Council	P. R. A. Willoughby, Engr. to Council, Council Offices, Pontypridd
" 12	Middlesex—Bridge Work, &c.	County Council	H. T. Wakelam, County Engineer, Guildhall, Westminster.
" 12	Lerwick, Scotland—Harbour Extension Works	Harbour Trustees	Clerk, Harbour Trustees' Office, Lerwick.
" 22	Bahia, Brazil—Railway		Secretary of Agriculture, Bahia, Brazil.

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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, September 28th, 1904.

NEW BUILDINGS AT NEW BROMPTON KENT

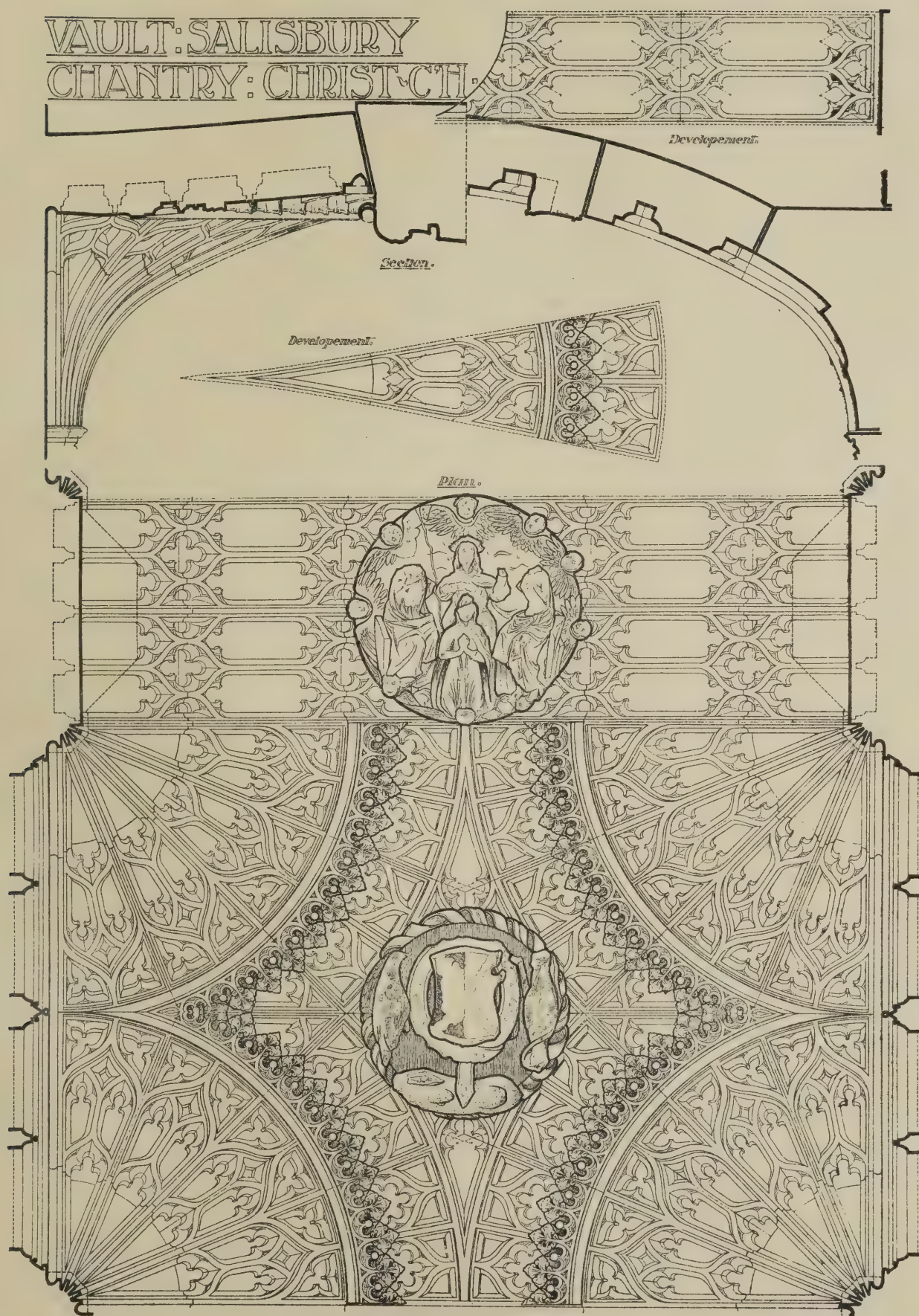
W. CAMPBELL JONES ARCHT
32 BEDFORD ROW, LONDON, W.C.



GROUND
FLOOR
PLAN



VAULT: SALISBURY CHANTRY: CHRIST CH.



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THE
BUILDERS' JOURNAL
AND ARCHITECTURAL RECORD.

September 28, 1904. Vol. 20, No. 503.

6, Great New Street, Fetter Lane, E.C.

Summary.

Speaking at last week's meeting of the Associated Portland Cement Manufacturers, Ltd., Mr. Frederick Anthony White, chairman, referred to a certain cheap brand of cement passing under the name of Portland, and said that after long deliberation they had come to the conclusion that when contracts for the cement had been executed the company had better give up its manufacture. Of the works where this cement was chiefly made three had been closed, and when the manufacture ceased the other works would only be used for making Portland cement of the usual quality. (Page 169.)

In London every sanitary authority must provide a proper coroner's court and mortuary, while in the provinces the authority have power, if they think fit, to do so in the latter case only, though the Local Government Board may require the local authority to provide the mortuary where the central body deem it essential. (Page 162.)

At the Ritz Hotel now being erected in Piccadilly, French methods of design and American methods of execution are in evidence. The foundation work is logically designed and elaborate, the loads being concentrated on 116 piers over the site. An old raft of concrete 3ft. thick which formed the foundations of former buildings caused trouble in removal, but has been successfully and economically dealt with by the use of pneumatic drills and blasting with cartridges of small charge. (Page 165.)

A two-guinea book on the Alhambra, in which Owen Jones's coloured plates are reproduced, has just been issued. (Page 171.)

Monk's Park stone is unquestionably the most popular of the oolite series. It is compact, close grained, suitable for exterior work in any position, and carries great weight. Monk's Park is situated to the south of Corsham. (Page 170.)

It is common practice nowadays to introduce hinges or pivots at the springings and also at the crown of arches to enable the arch to make small movements so as to adapt itself readily to the influence of external forces without developing cracks and fissures. (Page 170.)

The town hall at Newcastle is to be modernized at a cost of over £20,000. The scheme provides for a new council-chamber to seat ninety-five. (Page xiii.)

Have you written for particulars yet?

Our scheme for publishing once a month in *THE BUILDERS' JOURNAL* a directory of contractors, giving particulars of important contracts they have recently executed for well-known architects, continues to meet with approval, it being recognized as of the greatest service to architects and builders alike. Full particulars will be sent on application.

The Sessions House Accident.

THE accident which occurred last week at the Sessions House now being erected in the Old Bailey from designs by Mr. E. W. Mountford, F.R.I.B.A., has been reported in a rather alarming way by the daily press, the real facts of the case having been misrepresented by reason of some of the facts being concealed. While a piece of masonry weighing over two tons, and forming the base of one of the columns to be reared above the main entrance, was being lowered into position, it slipped from the iron lewis, and, carrying with it a quantity of scaffolding, fell with a crash on the masonry of the archway. Rolling over on to the platform, it fell on a mason named Houston, aged 40, and inflicted shocking injuries to his left thigh and leg, which resulted in his death. The lewis used was of the ordinary kind, consisting of two connected prongs of iron, which were placed in a hole made in the stone and wedged up with another piece driven in between the forks. The foreman of the works stated that in his opinion the lewis had not been securely fixed by the deceased, who was in charge of the operation of hoisting stones from the lorry in Newgate Street, and had superintended the work of putting nearly all the stones into position on the new building. This would appear to be the case, because the hole in the stone was 6ins. deep and the lewis was stated to have failed—not the stone. Houston it appears was assisting to guide the stone into position, and stepped on it so as to control it better when about 7ft. from its resting place. He fell with the stone, which rolled on him. An uncle of the deceased expressed the opinion that guard chains ought to be placed around stones which were being hoisted, as much for the safety of the public as for the workmen, and the jury added a rider "that more efficient provision be afforded in connection with the handling and raising of stones and other weighty materials by contractors and builders, and that copies of this rider be forwarded to the London County Council and the City Council." Of course this will seem to the public to be a warrantable suggestion, but they are not aware that this method of raising stone is a time-honoured one and has been proved by usage to be perfectly safe: in fact, we doubt if the raising of stone blocks by chains is not far more likely to result in accident in ordinary everyday work than by the use of lewises. With the latter it is difficult to make a mistake, the operation of fixing being so easy, whereas it is common knowledge to everyone how easy it is to get chains out of

place and wrongly balanced so as to cause a stone to slip; and with ordinary ignorant workmen accidents frequently occur. The places where the lewis method can fail are in the lewis itself, the adjustment of it, or the hole cut in the block. The first is very unlikely and a chain is just as liable to cause accident; the second is dependent on the care of the workman, as also the third, though carelessness in cutting the hole is not so dangerous as wrongful fixing. Accidents will happen, and though this one at the Sessions House is regrettable we must not become excited and abandon one method for another without being sure it is an improvement.

Plenum Ventilation.

OUR readers will remember the discussion which raged a short time ago in regard to the plenum system of ventilation so powerfully advocated by Mr. William Henman, who has proved his faith in this system being the most reliable of all by adopting it at the Royal Victoria Hospital, Belfast, of which he was the architect. In the course of the discussion many unkind things were said about the hospital, and the advocates of the natural system denied facts and figures, attempting to prove more especially that the system was a very costly one. Even if it were, it should be adopted for hospital work because of its regularity and efficiency. But statistics adduced by Professor Byers, M.A., M.D., in a report on the hospital, point to it being not only more efficient but more economical. The hospital was opened on July 27th last year. During last winter the average weekly consumption of coal was 45 tons. During the present summer, when the temperature was 125 degs. Fahr. in the sun or 80 degs. Fahr. in the shade, the temperature inside was 65 degs. Fahr. In summer the average consumption of coal was 18 to 20 tons per week. The expenditure in the old hospital for the six months ending June 30th, 1903, was £5,595, while that in the new hospital for the six months ending June 30th, 1904, was £7,073, an increase of £1,478. The average number of patients in the old hospital during the period named was 156 and 187 in the new, or, in other words, there was one-fifth more patients in the new than in the old hospital, so that by adding one-fifth to the 1903 expenditure we find the cost of patients to be £6,714, while the cost in 1904 was £7,073—an increase of £359, mainly representing the additional cost of the plenum system. But only 204 beds are at present in use in the new hospital, and the system will cost no more to work when the whole 300 beds are available.

CORONERS' COURTS AND PUBLIC MORTUARIES.

By E. B. B. NEWTON, A.M.I.C.E., F.S.I.

THE law in London relating to the erection of coroners' courts and public mortuaries differs somewhat to that in the provinces.

Coroners' Courts for London.

By section 92 of the Public Health (London) Act, 1891, the County Council shall provide and maintain proper accommodation for the holding of inquests, and may by agreement with a sanitary authority provide and maintain the same in connection with a mortuary or a building for post-mortem examinations provided by that authority, or with any building belonging to that authority, and may do so on such terms as may be agreed on with the authority.

Coroners' Courts in the Provinces.

In the provinces, save where authority is conferred by a local Act of Parliament, the local governing body have no power to provide and maintain a coroner's court, and as a consequence inquests are generally held in the nearest public-house, a practice the undesirability of which can scarcely be questioned.

Mortuaries in London.

By section 4 of the London Government Act, 1899, the powers of the former vestries and district boards were transferred to the present borough councils.

By section 73, sub-section 3, of the Public Health (London) Act, 1891, the removal of bodies of persons who may have died in a hospital from any dangerous infectious disease to a mortuary is expressly not forbidden.

By section 88 of the Public Health (London) Act, 1891, "every sanitary authority shall provide and fit up a proper place for the reception of dead bodies before interment (in this Act called a mortuary)" By section 91 "any sanitary authorities may with the approval of the County Council execute their duty under this Act with respect to mortuaries and buildings for post-mortem examinations by combining for the purpose thereof, or by contracting for the use by one of the contracting authorities of any such mortuary or building provided by another of such contracting authorities, and may so combine or contract upon such terms as may be agreed upon." By section 92 "the County Council shall maintain and provide proper accommodation for the holding of inquests and may by agreement with a sanitary authority provide and maintain the same in connection with a mortuary or a building for post-mortem examinations provided by that authority" (this power is extended by section 48 of the London County Council (General Powers) Act, 1897, to permit sanitary authorities to similarly provide this accommodation themselves with the agreement of the County Council.

By section 89 of the Public Health (London) Act, 1891, a justice may order certain dead bodies of persons who have died of a dangerous infectious disease, or dead bodies retained in rooms so as to endanger health, to be removed at the cost of the sanitary authority to a mortuary. Section 10 of the Infectious Disease (Prevention) Act, 1890, contains terms having in view similar objects, and section 8 forbids in certain cases the retention of the body of any person who has died of any infectious disease elsewhere than in a public mortuary or in certain rooms for more than forty-eight hours.

By section 90 of the Public Health (London) Act, 1891, "a sanitary authority may, and if required by the County Council shall, provide and maintain a proper building (otherwise than at a workhouse) for the re-

ception of dead bodies during the time required to conduct any post-mortem examination ordered by a coroner or other constituent authority and may make regulations with respect to the management of such building," and "any such building may be provided in connection with a mortuary, but this enactment shall not authorize the conducting of any post-mortem examination in a mortuary."

By section 93 of the Public Health (London) Act, 1891, the County Council may provide and fit up in London one or two places for the reception of unidentified bodies.

Section 133 of the Public Health (London) Act, 1891, exempts the City from the liability to provide a building for post-mortem examinations.

Mortuaries in the Provinces.

By section 141 of the Public Health Act, 1875, "any local authority may, and if required by the Local Government Board shall, provide and fit up a proper place for the reception of dead bodies before interment (in this Act called a mortuary), and may make by-laws with respect to the management and charges for use of the same; they may also provide for the decent and economical interment, at charges to be fixed by such by-laws, of any dead body which may be received into a mortuary."

By section 142 of the Public Health Act, 1875, a justice may order "a body of one who has died of any infectious disease" retained in a room in which persons live or sleep, or "any dead body which is in such a state as to endanger the health of the inmates of the same house or room," and which is retained in such a house or room, to be removed at the cost of the local authority to any mortuary provided by such authority.

By section 143 of the Public Health Act, 1875, "any local authority may provide and maintain a proper place (otherwise than at a workhouse or at a mortuary) for the reception of dead bodies during the time required to conduct any post-mortem examinations ordered by a coroner or other constituted authority, and may make regulations with respect to the management of such place; and where any other place has been provided, a coroner or other constituted authority may order the removal of the body to and from such place for carrying out such post-mortem examination, such costs of removal to be paid in such manner and out of the same fund as the costs and fees for post-mortem examinations when ordered by the coroner."

Sections 8 and 10 of the Infectious Disease (Prevention) Act, 1890, previously referred to, apply to the provinces as well as to London.

In London therefore every sanitary authority must provide a proper coroner's court and mortuary, while in the provinces the authority have power, if they think fit, to do so in the latter case only, though the Local Government Board may require the local authority to provide the mortuary where the central body deem it essential.

In densely populated areas the desirability of the establishment of a mortuary is self-evident, and the reason of the difference in the law is apparent. At the same time such a building is quite a necessity in the large provincial towns, and a modification of the law relating to their areas is only a question of time.

The provision of a post-mortem room is left to the discretion of the authority, save that in London the County Council may require one to be made available. Everywhere the erection of such a room in connection with a workhouse is forbidden. In the provinces a post-mortem room may not be constructed in connection with a mortuary, but in London this is not forbidden.

The reason for these restrictions is the fact of the prejudice in the minds of people, especially of the poorer classes, against the dissection of the bodies of their friends, and to entirely disassociate the mortuary from a building wherein such an operation may be carried on is to incline persons with such objections to view with more favour the use of the mortuary for the reception of dead bodies.

On July 25th, 1882, the Local Government Board issued a series of model by-laws (XV.) relating to mortuaries, which may be obtained from the King's printers. The publication is prefaced by a model plan of a mortuary for a town of 100,000 inhabitants, and by a memorandum dealing with the law in the provinces relating to the erection and use of mortuaries, together with very valuable hints on their site, structures and administrative arrangements. In a few minor matters the suggestions are perhaps a little out of date at the present time.

Disinfecting Stations (in London).

By section 59 of the Public Health (London) Act, 1891—

(1) Every sanitary authority shall provide, either within or without their district, proper premises with all necessary apparatus and attendance for the destruction and for the disinfection, and carriages or vessels for the removal, of articles (whether bedding, clothing, or other) which have become infected by any dangerous infectious disease, and may provide the same for the destruction, disinfection and removal of such articles when infected by any other disease; and shall cause any such articles brought for destruction or disinfection, whether alleged to be infected by any dangerous infectious disease or by any other disease, to be destroyed or to be disinfected and returned, and may remove, and may destroy, or disinfect and return, such articles free of charge.

(2) Any sanitary authorities may execute their duty under this section by combining for the purposes thereof, or by contracting for the use by one of the contracting authorities of any premises provided for the purpose of this section by another of such contracting authorities, and may so combine or contract upon such terms as may be agreed upon.

By section 60 of the Public Health (London) Act, 1891—

(1) Where the medical officer of health of any sanitary authority, or any other legally qualified medical practitioner, certifies that the cleansing and disinfecting of any house, or part thereof, and of any articles therein likely to retain infection, or the destruction of such articles, would tend to prevent or check any dangerous infectious disease, the sanitary authority shall serve notice on the master, or where the house or part is unoccupied on the owner, of such house or part that the same and any such articles therein will be cleansed and disinfected or (as regards the articles) destroyed, by the sanitary authority, unless he informs the sanitary authority within twenty-four hours from the receipt of the notice that he will cleanse and disinfect the house or part and any such articles or destroy such articles to the satisfaction of the medical officer of health or of any other legally qualified medical practitioner within a time fixed in the notice.

(2) If either—

(a) Within twenty-four hours from the receipt of the notice the person on whom the notice is served does not inform the sanitary authority as aforesaid; or

(b) Having so informed the sanitary authority he fails to have the house or part thereof and any such articles disinfected or such articles destroyed as aforesaid within the time fixed in the notice; or

(c) The master or owner without such notice gives his consent, the house or part and such articles shall be cleansed and disinfected or such articles destroyed by the

officers and at the cost of the sanitary authority under the superintendence of the medical officer of health.

(3) For the purpose of carrying into effect this section the sanitary authority may enter by day on any premises.

(4) The sanitary authority shall provide, free of charge, temporary shelter or house accommodation with any necessary attendants for the members of any family in which any dangerous infectious disease has appeared, who have been compelled to leave their dwellings for the purpose of enabling such dwellings to be disinfected by the sanitary authority.

(5) When the sanitary authority have disinfected any house, part of a house or article under the provisions of this section, they shall compensate the master or owner of such house, or part of a house, or the owner of such article, for any unnecessary damage thereby caused to such house, part of a house or article; and when the authority destroy any article under this section, they shall compensate the owner thereof; and the amount of any such compensation shall be recoverable in a summary manner.

By section 61 of the Public Health (London) Act, 1891, the bedding, clothing and articles if so disinfected by the sanitary authority shall be brought back and delivered to the owner free of charge, and if any of them suffer any unnecessary damage the authority shall compensate the owner for the

same, and the authority shall also compensate the owner for any articles destroyed; and the amount of compensation shall be recoverable in a summary manner.

Disinfecting Stations (Provinces).

By section 122 of the Public Health Act, 1875, any local authority may provide a proper place, with all necessary apparatus and attendance, for the disinfection of bedding, clothing or other articles which have become infected, and may cause any articles brought for disinfection to be disinfected free of charge.

By section 229 of the Public Health Act, 1875, the expense incurred by a rural authority in the execution of this Act shall be divided into general expenses and special expenses. General expenses (other than those chargeable on owners and occupiers under this Act) shall be the expenses of the establishment and officers of the rural authority, the expenses in relation to disinfection, the providing conveyance for infected persons, and all other expenses.

It will thus be seen that in London the provision of proper facilities for disinfection is obligatory upon the sanitary authority, while in the provinces this is optional. In London also the authority must provide shelters for persons temporarily disoused while their own abode is being disinfected.

A laundry establishment may reasonably be considered to form a necessary auxiliary to a disinfecting station, though it is not specially alluded to in the sections of

the Acts relating to disinfection previously enumerated.

Verminous Persons.

By the Cleansing of Persons Act, 1897, local authorities may, if they think fit, provide apparatus for the cleansing from vermin of the person and clothing of any person infected.

Disposition of Buildings.

Mortuaries are generally attached to hospitals, infirmaries and workhouses, but these are usually designed for the needs only of the particular institution to which they belong.

Mortuaries may be part of a group of buildings comprising coroner's court, mortuaries for ordinary cases and for the bodies of persons who have died of an infectious disease, mortuary chapel for the reception of bodies awaiting burial and which cannot conveniently be retained elsewhere, post-mortem room, laboratory, incinerator, disinfecting station, laundry, shelter, stables, van and store sheds, officers' and attendants' apartments, or the last may be erected separately in distinct and convenient situations. In London an establishment for dealing with verminous persons may conveniently be placed on the site. It would appear from a return published by the County Council that during the year 1892-3 about seven thousand inquests were held and three thousand post-mortem examinations other than at hospitals made in the county of London.

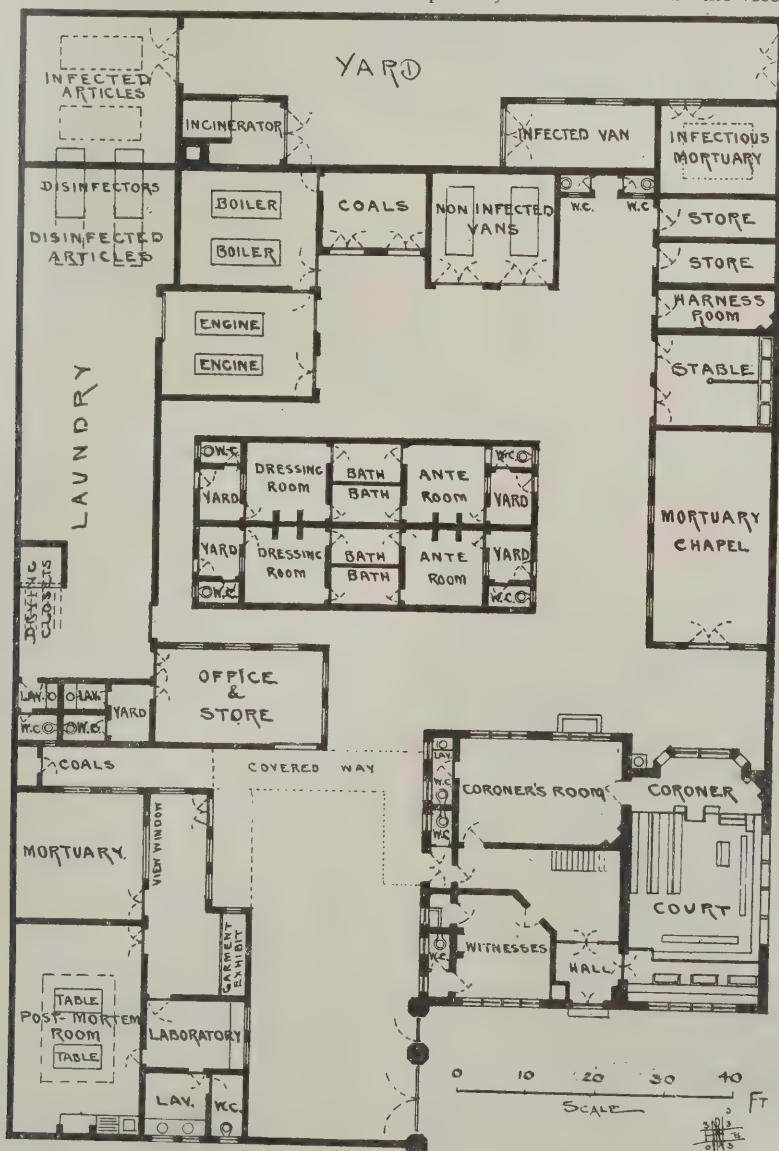
Site.

The site for a coroner's court and mortuary buildings should be chosen with the utmost care, as in some neighbourhoods their erection would materially depreciate the value of the property in the vicinity.

The most important requirements in the site for the particular purposes of the mortuary are that it shall be as large as possible and give every opportunity for plenty of air and light without direct sunlight, adequate ventilation and efficient drainage.

Most appropriate positions for such buildings would be in contiguity to cemeteries and burial-grounds, save that these grounds are generally some distance from the centre of the town they serve and so inconvenient. In such cases sites must be chosen in readily accessible positions, preferably some distance from dwelling-houses and near open spaces. Unfortunately such sites are, as a rule, difficult to obtain economically in large towns, and consequently the area available is often small and the number and sizes of the various buildings required are correspondingly restricted. If the buildings be of suitable design there would appear to be no reason to screen them from public observation further than is necessary to prevent persons being offended by seeing the conduct of operations in connection with the use of the various buildings. For this reason it should be rendered impossible for any view of the interior of the buildings or of operations in connection with them to be obtainable from without, and the entrances should be so screened that vehicles containing bodies may have these removed in complete seclusion. The position of buildings, though some distance away, should be carefully studied with this object in view, as it may be found that the windows of neighbouring houses have quite an unexpected prospect of the mortuary grounds. Where a coroner's court forms part of a scheme it may be utilized with advantage so as to form a screen for the rest of the buildings.

A great difficulty is the almost universal objection of the public to such buildings, especially when accompanied by an incinerator or destructor and a disinfecter. So strong is this prejudice that in some cases in large towns it may be found virtually impossible for the local authority to obtain in their own



The roof lights over the non-infectious buildings are not shown.

SKETCH PLAN OF A SCHEME FOR CORONER'S COURT, MORTUARIES AND APPURTENANT BUILDINGS.



RITZ HOTEL, PICCADILLY: GENERAL VIEW OF SITE, SHOWING FOUNDATION WORK.

district a site whereupon an incinerator or destructor or a disinfecting station may be erected. It can hardly be questioned that good-class residential property would be seriously affected in value by the erection near it of any of the before-mentioned sanitary establishments. Though every proof may be shown of the harmless and even beneficent effect of the work to be carried on, sentimental objections will still remain and as much pressure may be brought to bear upon the authority as to cause them to select a site well outside the town boundaries, when the additional expense of the transport to and from the selected site of goods to be dealt

with will have to be taken into consideration. In some cases motor traction may be found advantageous, but it should not be forgotten that such traction can only be successful when provided with constant work at a fair speed. If there are to be delays between ordinary journeys mechanical traction will not be economical.

Design and Construction.

In the past it has been a common practice to erect mortuary buildings of a gloomy and even repellant aspect. There is no reason for this. Such a building may be appropriately designed so as in no way to show other than a character fitting to its purpose and yet be

pleasing and artistic. An illustration of such a design by Mr. Paul Waterhouse, which appeared on p. 80 of *THE BUILDERS' JOURNAL* for September 9th, 1903, may be cited as an example.

Where the coroner's court is close by, such provision should be made as will enable the jurymen to visit the mortuary and view the body without suffering from the effects of inclement weather. A sheltered and if necessary raised path, covered with a light roof of wood or iron and glass supported upon timber posts or iron columns, will suffice for this. In some such cases it may be found necessary to construct such roofs entirely on cantilevers to avoid the obstructions caused by posts or columns.

It is of first importance that there be a good circulation of air around the premises and plenty of light everywhere. In most mortuaries and post-mortem rooms the objectionable odour which is unmistakably characteristic of the presence of dead bodies is too often very noticeable. The planning must depend upon the shape of the available site. Where a comprehensive scheme is to be carried out a desirable feature is an arrangement by which all infected bodies and articles may be entirely secluded from the remainder of the premises. Placing the coroner's court about the centre of the front, on one side may be the main entrance and on the other an entrance leading to the entrance to the infectious mortuary, infectious side of the disinfectant, incinerator, infectious van sheds, &c. A solid wall will separate these buildings from the rest of the site, on which will be the general mortuary, &c. The plan on the preceding page shows such an arrangement, though the entrance to the infectious portion of the buildings is some distance away from the coroner's court itself.

The buildings should be so arranged as to have one central courtyard (or more, if requisite) affording space where hearses may turn.

(To be concluded.)



EXCAVATIONS FOR STEEL CANTILEVER FOUNDATIONS.

THE RITZ HOTEL.

WE have arranged to illustrate the erection of the new Ritz Hotel in Piccadilly, which will occupy the site of the two hotels at the corner of the Green Park. This is a work of considerable magnitude. It is being erected under the management and supervision of men from the United States who have had wide experience of large building works there. While the contractors, the Waring-White Building Co., Ltd., are particularly modest, making no claim to do either an extraordinarily quick job or a very cheap one, we may expect to see introduced various methods employed in modern American contracting practice new to this country; while as the architects are Messrs. Mewes & Davis, of 6, Dean Street,



PNEUMATIC DRILLING PREPARATORY TO BLASTING OLD CONCRETE RAFT.

electric-light wires, gas pipes, &c., embedded in its concrete foundation. The other view shows the excavations being carried down somewhat deeper than the others to allow steel cantilever foundations to be put in to carry the external wall at this part. We shall illustrate and explain these (probably the first use of cantilever foundations in this country) when the job reaches the proper stage. For the present we shall merely say that by their use the foundations will not spread on the neighbouring land. The whole weight of the building will be concentrated at points (116 in all) on various parts of the site, and each of the 116 sustaining piers has its separate grillage foundation of steel joists, the bearing area being proportioned according to the weight concentrated thereon. This is more economical and safer than the usual raft of concrete. In excavating the site, from which about 2,000 yds. have been taken out, the contractors unexpectedly came upon an old raft of concrete belonging to the buildings formerly on the ground, and as this was 3ft. thick they were troubled to know how to remove it. It was eventually overcome by the use of the pneumatic drills supplied by the Consolidated Pneumatic Tool Co., Ltd., of Palace Chambers, 9, Bridge

Street, Westminster. These were of the Chicago Rock Drill pattern, consuming only 42 cub. ft. of free air per minute. The weight of the drill is 50 lbs. and it can be operated by unskilled labour with perfect safety, doing the work in one-twentieth of the time



RAFT BEFORE BLAST.

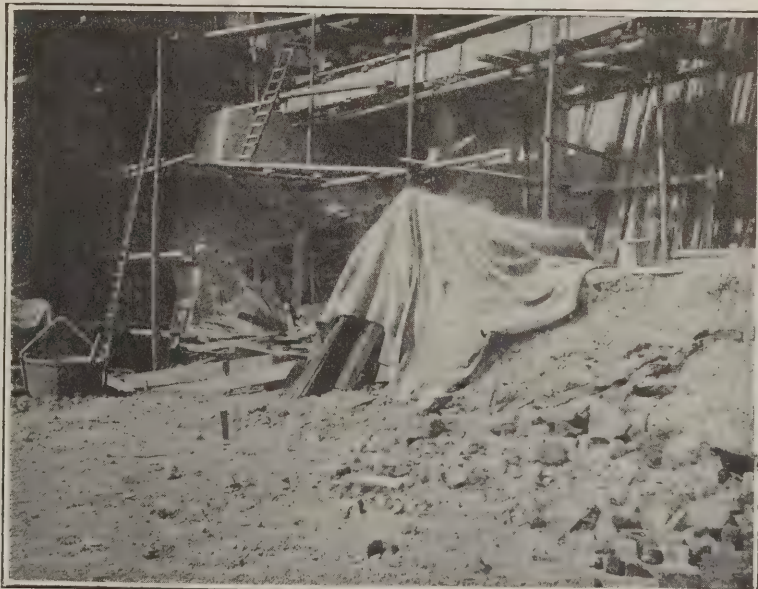
required by hand. Cartridges with small charges were used for blasting, to avoid any danger or disturbance, and the concrete was broken off in small lumps, easy to handle, as shown in one view.

Soho, W., and Mr. Mewes designed the Ritz Hotel in Paris, where he resides, and practice in the French capital varies from that here, the job should be suggestive and instructive to English contractors and architects. With a view of keeping our readers informed, we propose publishing photographs and details from time to time as the job progresses. We give the first instalment this week. The two photographs on the opposite page (specially taken for us) represent the state of the job on September 16th.

We may call attention to the side of Piccadilly supported on struts from the basement retaining wall. This was preserved intact so as to avoid the trouble and danger of disturbing the many telephone cables,



RAFT AFTER BLAST.



THE BLAST.

OUR PLATES.

THE block of flats called "Hanover House," Regent's Park, N.W., overlooks Lord's cricket-ground. The building is faced with red bricks and Portland-stone dressings, bands, chimney-caps, &c., the roofs being covered with sea-green slates, and the areas faced with white-glazed bricks. In addition to well-lighted staircases, electric lifts give access to all the floors, and there are in addition luggage and parcel lifts and exterior fire staircases. The halls of each flat are heated by hot water. A telephone exchange will be in the porter's lodge of each building, with extension instruments in every flat. Most of the flats contain four or five bedrooms, bathroom, two reception-rooms, entrance-hall, kitchen, larder, housemaid's pantry, two w.c.'s, linen closet and convenient cupboards. On the top floor are several studio flats, with north light, containing five to six rooms, with large studio and bathroom, the other conveniences being similar in all

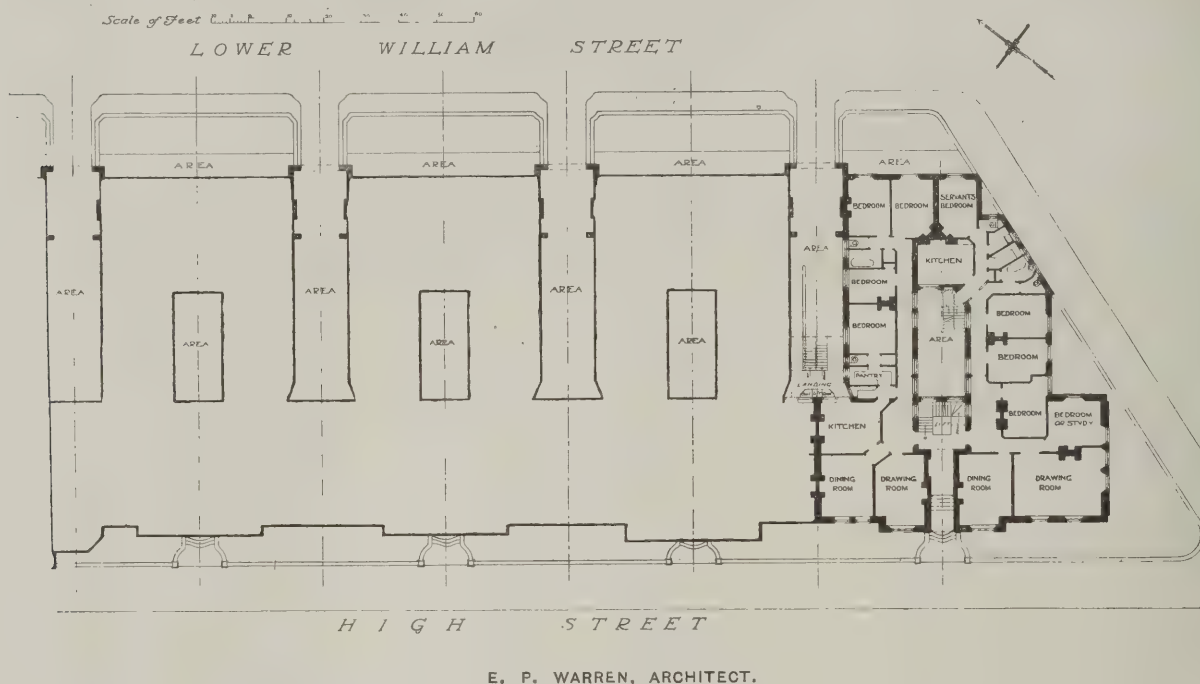
and conjecture points to Pietro Torrigiano, who is known to have been engaged upon work at Westminster, Windsor, and in the Rolls Chapel. The ceiling, the subject of our illustration, is a rich example of fan-vaulting. The armorial bearings, &c., upon the bosses were defaced by the Commissioner of Henry VIII. In a letter the Commissioner wrote: "In thys church we founde a chaple and a monumet curiously made of cane stone p'pared by the late mother of Raynolde Pole for herre buriall, which we have causyd to be defaced and all the Armis and Badgis to be delete." The measured drawing of the vaulting which we reproduce is by Mr. John Swarbrick.

ASSESSMENT OF BRICK-FIELDS.

IN a useful little book called "The Ratepayer's Guide," just published by Mr. H. Goddard, surveyor, St. Stephen's Chambers, Wolverhampton (price 1s.), some in-

the right principle of assessment, the second what was the right amount of the assessment, having due regard to the tenant and to the ratepayers alike. The practice in the district was to fix a royalty by way of rent, while in some cases there was a "dead" or surface rent in addition. The Recorder thought it both more convenient and just to adopt the principle of royalty rather than of rent per acre as the ruling basis of assessment. As an instance, he observed that this principle would apply to two brickfields of similar character and extent, but on one of which there might be a double number of stools working out the brickfield at double the rate. An obvious injustice might be done to the ratepayers unless such a principle were adopted. The evidence satisfied the Recorder that 3s. 6d. per thousand had been paid in the present case, and on adjoining fields 4s. per thousand, and even 4s. and a "dead" rent. He was therefore satisfied that the land might reasonably be expected to let at a royalty of 2s. 9d. per thousand.

HANOVER HOUSE. REGENT'S PARK, N.W.



respects. The architect is Mr. E. P. Warren and the builders are Messrs. Holloway Brothers.

The new buildings at New Brompton, Kent, designed by Mr. W. Campbell Jones, F.R.I.B.A., have recently been erected for the London and County Banking Co., Ltd., on the site of the old premises, and include a manager's residence on the first and second floors and part of the ground floor. There is strong-room and book-room accommodation in the basement. The front is faced with brown Portland stone with bands of blue pennant, the roofs being covered with green Westmoreland slates. The joinery-work for the banking office, including the fittings, is all carried out in teak. Messrs. Wiltshire & Son, of Sevenoaks, were the general contractors.

The exquisite Salisbury Chantry at Christchurch Priory was erected for Margaret, Countess of Salisbury, who was beheaded on Tower Hill in the year 1541 at the command of King Henry VIII. The chapel is built of Caen stone, and the architectural treatment shows a most interesting combination of late Gothic and Italian Renaissance detail. There can be no doubt that the work was executed in some degree by an Italian,

interesting particulars are given in regard to the assessment of brickfields.

A case is supposed of a brickfield worked out in less than a year to meet an enormous contract, the consequence of which would be that the land would have a very much increased value for the year, and it would be only reasonable that it should bear an increased rate for that year. No injustice would be done if in every year the occupier could be assessed according to the actual value in that year, and it is the duty of the overseers—says the author of these notes—to arrive as nearly at this as they can. In the appeal of Mr. Scaddon against the assessment of his brickfield, heard at the Portsmouth Borough Sessions, the Deputy Recorder said:—The appellant occupies $3\frac{1}{2}$ acres of land at Copnor as a brickfield, paying a royalty of 3s. 6d. per thousand bricks, calculated upon the full amount of brick earth excavated, and all rates, taxes and expenses. There are two stools, capable of turning out 1,300,000 bricks per annum. The appellant has been in occupation about five years, and about $1\frac{1}{2}$ acres have been worked out. The evidence showed that hitherto the appellant has paid rates on an admittedly inadequate assessment. The first question to be decided was, what was

He pointed out, however, that the ultimate question was that propounded by the statute, and therefore the amount which had been paid, or what it was reasonable to infer would be paid, was the only evidence, per Chief Justice Penman in *Regina v. Westbrook* (16 "Law Journal," M.C. 87), and a business-like tenant would expect some latitude both in the price per thousand to be paid and in the amount of brick earth to be used in making his estimate at the beginning (as he must do) in place of calculating at the end of the year. The price of 2s. 9d. per thousand, fixed by the respondent, gave such latitude, but the amount of brick earth, 922,000, to be worked out in the coming year, fixed upon the amount worked out in the past year, did not do so. The Recorder was of opinion that the tenant, having regard to the full capacity of the works being 1,300,000 and the amount of the past year being 922,000, might reasonably be expected to estimate upon a lower figure than the latter, and he put this figure at 875,000. He fixed the gross estimated rental of these brickfields at £133 and the ratable value at £115, and ordered the rate book to be amended accordingly, but made no order as to costs.

Builders' Notes.

Painters' Exhibition at Manchester.—The exhibition of house decoration inaugurated by the National Association of Master House Painters and Decorators of England and Wales was held last week in St. James's Hall, Manchester.

New York Building Strike Ended.—The building strike in New York collapsed on Thursday morning last after a long fight wherein the president of the consolidated unions has been indicted for blackmail, many reputations have been smirched, and much violence has been committed.

Building Trade Dull.—According to returns supplied by seventy-three employers' associations whose members are estimated to employ about 84,000 building operatives of all classes, and by trade unions with an aggregate membership of about 185,000, employment in the building trades continued dull during August, and on the whole showed little change as compared with July. It is, however, rather worse than a year ago. Employment in London is slack generally.

Howth Sewerage Scheme: Accepted Plans.—In the competition for a sewerage scheme for Howth and Sutton, Dublin, the plans prepared by Mr. P. H. McCarthy, Dublin, have been accepted. According to this scheme the sewage from Howth would be conveyed by gravitation to a point near the railway and discharged at low water after partial purification in a septic tank. The Sutton sewage would be similarly dealt with. The cost of the scheme is estimated as follows:—Howth town only, £6,132; Howth district, £8,458;

complete scheme, £16,806. Mr. Francis Bergin, C.E., was the assessor.

R.I.B.A.

THE following papers are to be read before the Royal Institute of British Architects during the coming session:—

Nov. 21.—"Concrete," by Mr. L. G. Mouchel (agent for Hennebique's patents); "The Construction and Strength of Reinforced Concrete," by Mr. William Dunn.

Dec. 19.—"Architecture and Building Acts," by Mr. Lacy W. Ridge and Mr. James S. Gibson.

Jan. 23.—"European Architecture in India," by Mr. James Ransome.

Feb. 20.—"Architectural Education," by Mr. Reginald Blomfield.

March 20.—"Decorative Painting," by Sir William Richmond and other artists.

April 3.—"The Planning of Cities and Public Spaces," by Mr. John W. Simpson; "The Architectural Improvement of London," by Professor Beresford Pite.

April 17.—"The Garden and its Accessories," by Mr. Mervyn Macartney.

May 15.—"Sculpture and Architecture."

Sir William Emerson's Portrait—Members who have not yet contributed to the portrait fund are requested to forward subscriptions to the secretary, R.I.B.A. It is proposed to close the fund on October 31st.

Kalendar 1904-1905.—Members who have not already done so are requested to notify the secretary of any changes of address not later than Monday, October 5th.

The Autumn Examinations will be held as follows:—

Preliminary, November 8th and 9th. (Applications, on official forms, to be sent in by Saturday, October 8th.)

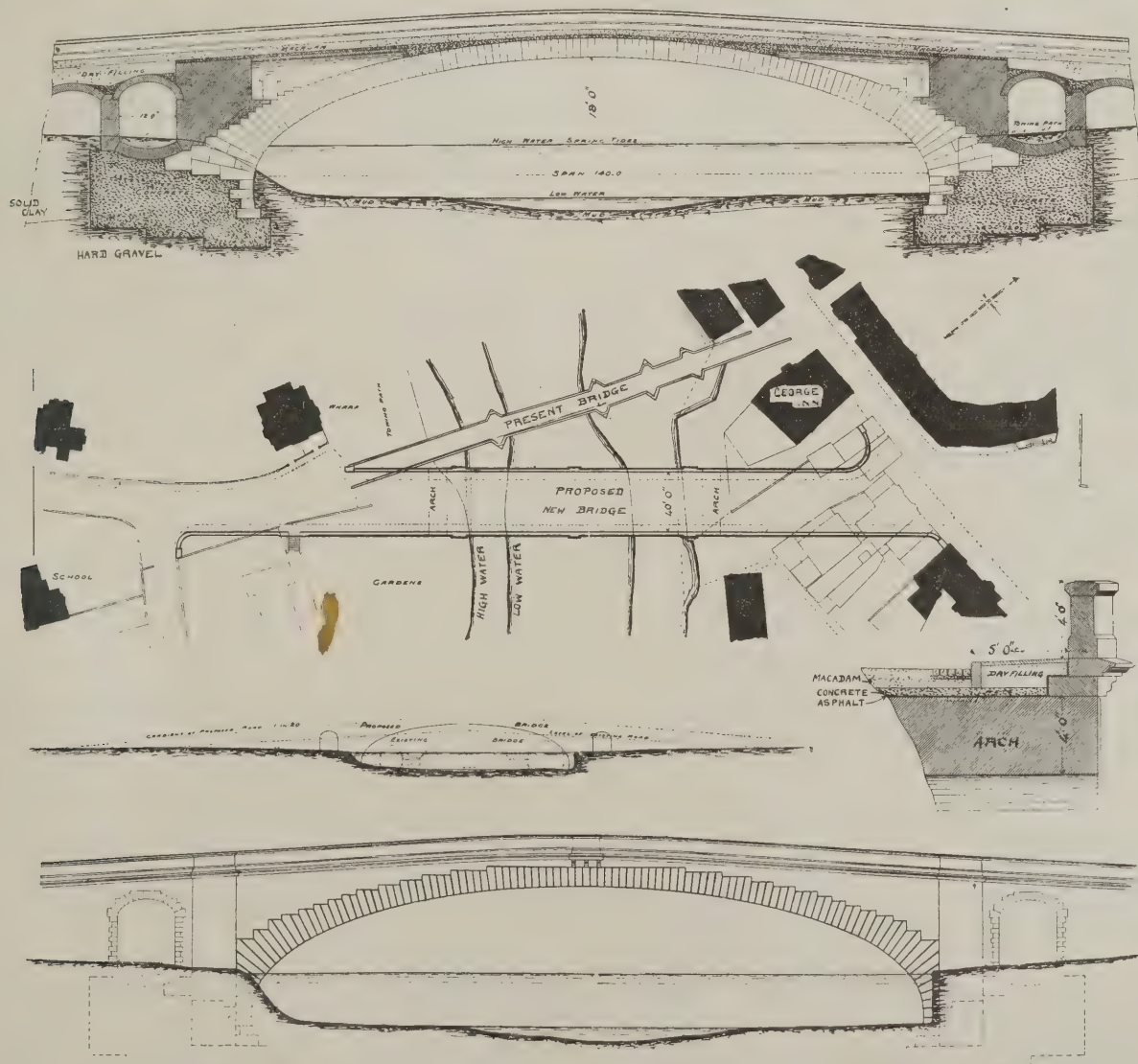
Intermediate, November 8th, 9th, 10th and 11th. (Applications by October 8th.)

Final and Special, November 25th to December 2nd inclusive. (Applications by Saturday, October 22nd.)

Examinations qualifying for the office of district surveyor in London and of building surveyor under local authorities will be held on October 20th and 21st. (Applications by Thursday, October 6th.)

AYLESFORD BRIDGE.

THE illustrations on this page show the design for the proposed new bridge across the Medway at Aylesford by Messrs. Dodd & Dodd, civil engineers, of Birmingham. This design gained the first premium of £100 in a competition for which twenty-eight sets of plans were submitted. Mr. A. V. Hurtzig, of Westminster (nominated by the president of the Institution of Civil Engineers), was the assessor. It is intended to adopt a reduced width of 34ft. and a height of 16ft. above high water. The total cost is estimated at £37,000. The bridge is to be built of Kentish rag and granite. It was made a condition of the competition that the river should be spanned by a single arch of not less than 100ft. span at high-water level, with a headway equal to that of Rochester Bridge.



ACCEPTED DESIGN FOR NEW BRIDGE OVER THE MEDWAY AT AYLESFORD. DODD AND DODD, CIVIL ENGINEERS.

MODERN LONDON BUILDINGS.

(Continued from p. 159, No. 502.)

N.W. DISTRICT: RELIGIOUS BUILDINGS.

BUILDING.	ARCHITECT.	APPROXIMATE COST.	REMARKS.
1876. Hampstead Cemetery, Fortune Green Lane - - -	Charles Bell	£ 7,093	The chapels are connected by a central tower and spire 93ft. high.
1877. St. Luke's Church, Kilburn Park - - - - -	J. T. Lee	4,500	107ft. long, 57ft. wide and 54ft. high to the nave ridge. 800 free sittings.
1878. St. Saviour's Church, Mission Room Hampstead - - -	Batterbury & Huxley.	—	51ft. long, 24ft. wide and 24ft. high.
Trinity Church, South Hampstead - - - - -	Henry S. Legg	13,000 (exclusive of spire and tower).	Length 118ft., including the chancel, which is 36ft. long. The nave is 70ft. high to ridge, and accommodates 1,000 people. Exterior of Kentish rag and Caen stones.
1879. St. James's Church, Marylebone - - - - -	Gilbert Scott	—	New front elevation.
1881. Church of Our Lady of the Rosary Dominican Priory, Haverstock Hill.	Charles A. Buckler	21,000	200ft. long, the nave being 140ft. long and the choir 60ft. by 30ft. in width. Height 6 ft.
St. Michael's Church, Camden Town - - - - -	Bodley & Garner	—	The style is early fourteenth-century Gothic.
1882. Synagogue, Abbey Road, St. John's Wood - - - -	H. H. Collins	8,000	Measures internally 58ft. by 45ft. 6ins. by 31ft. 6ins. high. Accommodation for 490 people.
Church of the Holy Cross, St. Pancras - - - - -	Joseph Peacock	7,500	Under the church is a room for parish purposes; also a library.
St. Paul's Church, Finchley - - - - -	John Ladds	—	The nave is 78ft. 8ins. by 55ft. 2ins.
1889. Parsonage of the Church of the Good Shepherd, Hampstead	James Brooks	—	At the corner of Savernake and Courthope Roads. Faced with red Suffolk bricks.
St. Mary's Abbey, Mill Hill Chapel - - - - -	Goldie, Child & Goldie.	—	Exterior of red brickwork, interior of light stone-coloured brickwork, with stone dressings.
1894. Church of the Good Shepherd, Gospel Oak - - - -	James Brooks & Son.	18,000	Of Ancaster stone, with core of Portland-cement concrete. Crypt containing vestries and parish room under east end. There are turrets at either end of the church. Groined in stone. Accommodation for 1,400 persons.
St. Michael's Church, Camden Town (chancel) - - -	Bodley & Garner	5,500	48ft. long, 25ft. wide and 59ft. high. Panelled with wood.
1895. Congregational Buildings, Finchley - - - - -	Spalding & Cross	4,500	Comprises large hall seating 850 persons and arranged to form classrooms, library, &c.
St. Andrew's Church, Willesden - - - - -	J. Brooks & Son	—	Church accommodates 350, hall 500, infants' classrooms 100 children.
West Hampstead Congregational Church - - - -	Spalding & Cross	8,000	Accommodates 600. Mr. Day was associated with Messrs. W. & C. A. Bassett Smith. Lady-chapel and chantry and three bays of nave.
1896. Church of St. Gabriel, Willesden Green - - - -	Philip Day	7,000	
Congregational Hall, Quex Road, Kilburn - - - -	H. Chatfeild Clarke	3,200	
1898. Bell Street Mission Premises, Fogware Road - - -	H. Chatfeild Clarke	3,000	Four storeys, containing workroom, classrooms, chapel, &c.
1899. St. Luke's Church, West Hampstead - - - - -	Basill Champneys	11,560	Seats 750. Underneath are parochial rooms, choir vestry, &c.
1900. Mission Church, Taylor's Lane, Willesden - - - -	— Fry	1,250	Accommodation for 200 worshippers.
Presbyterian Church, Kondu Road, Cricklewood - - -	A. O. Breeds	—	The church seats 610 people.
Wesleyan Church, Gospel Oak - - - - -	Beresford Pite	—	At corner of Lisburne and Agincourt Roads. Accommodates 800.
R.C. Church of the Sacred Heart, Queen's Road, Kilburn	Pugin & Pugin	—	First portion built about 1880, comprising four bays of nave. The church has now six bays in the nave. Length 121ft., width across nave and aisles 50ft., height 60ft.
Chapel of St. Mary the Virgin, Brondesbury - - -	G. H. Fellowes Prynn.	2,500	Accommodation for 180 adults. Of Box Ground and Corsham Down stone and red brickwork.
Church of St. Michael, Willesden - - - - -	Goldie, Child & Goldie.	—	Roofs constructed with curved ribs and covered with Westmoreland slates. Seating for 600 persons.
Church of the Good Shepherd, Hampstead - - - -	James Brooks	16,000	Accommodation for 1,600 people, all on the ground floor. Stone groined throughout.
Hampstead Synagogue, West End Lane, Hampstead -	Delissa Joseph	11,000	Octagonal, with a gallery on columns supporting ribs of dome. Interior finished pure white with dark oak joinery.
Wilkesden Cemetery Chapels - - - - -	Charles Worley	—	
1901. Church of All Hallows, North St. Pancras - - - -	James Brooks	17,000	Exterior of Derbyshire rag, interior of Portland stone. Accommodates 1,200.
Church of St. Matthew, Willesden - - - - -	W. D. Caröe	—	Accommodates 500; 800 when completed.
Synagogue, Princess Road, Finsbury Park - - - -	Delissa Joseph	—	Will accommodate 190 males on ground floor and 144 females in galleries.
Presbyterian Church, Frogna Lane, Hampstead - - -	Pite & Balfour	—	Will accommodate 750 persons.
1902. St. Cyprian's Church, Upper Park Place, St. Marylebone	W. Bucknall & J. N. Cowper.	12,090	Divided into seven bays by two arcades 54ft. wide, 124ft. long, 40ft. high. The church will accommodate 600. Materials, Bath stone and brick.
United Methodist Free Church, Harrow Road, Willesden	W. H. Dursley	—	

N.W. DISTRICT: COLLEGES, SCHOOLS, &c.

1816. Board School corner of Nettlevale and Capland Streets -	E. R. Robson	£ 9,942	Accommodates 829.
1877. Camden School for Girls - - - - -	E. C. Robins	6,287	Kentish rag stone facings and Bath stone dressings. Accommodates 400.
1878. Board Schools, Henrietta Street - - - - -	E. R. Robson	8,370	Accommodates 573.
1880. North London Collegiate School for Girls, Sandall Road (additions).	E. C. Robins	—	Hall 70ft. by 39ft. by 32ft. high. Accommodates 500.
1881. Orphan Working School, Haverstock Hill - - - -	Charles Bell	2,500	Accommodates 900.
High School for Girls, Morefield Gardens, South Hampstead	E. C. Robins	7,000	Accommodates 275.
1886. Congregational College, Finchley Road - - - - -	Michael Manning	20,000 (incl. site).	There is a house for the principal, with studies and dormitories for 36 students.
1888. Conservatoire of Music, Hampstead - - - - -	Rowland Plumble	—	In rear is a hall 90ft. long by 45ft. by 35ft. high. Red brick and red Mansfield stone.
1890. Royal Veterinary College, Great College Street, Camden Town.	Arthur Vernon	7,000	New wing 200ft. long, providing testing and riding space for horses on ground floor. Theatre above for 400 students.
1892. Maria Grey Training College, Salisbury Road, Brondesbury	J. Osborne Smith	10,000	Accommodates 75 day students and 200 children.
1893. "The Hall," High School for Girls, Hampstead - - -	E. R. Robson	—	
1896. Church School, Clarendon Square, Somers Town - -	Sir Arthur Blomfield.	5,500	Accommodates 500.
1898. Mill Hill Grammar School, New Chapel - - - - -	Basill Champneys	6,000	Rebuilding.
St. Paul's National Schools, Broadley Terrace, Lisson Grove.	A. G. Stenning	—	

N.W. DISTRICT: BUSINESS PREMISES.

1885. Premises for Wilkinson, Heywood & Clark, Caledonian Road.	Romaine, Walker & Tanner.	£ —	The front is of red bricks; tile-hung.
Reed Brothers' Beer Bottling Stores, Kentish Town - -	J. K. Green & Son	—	In the Early Scottish Baronial style, in red brick and buff terra-cotta.

N.W. DISTRICT: BUSINESS PREMISES—*cont.*

BUILDING.	ARCHITECT.	APPROXIMATE COST.	REMARKS.
1886. Somers Town Midland Railway Goods Station, Euston Road.	J. Underwood	£ 2,500,000	Euston Road frontage 300ft. long and 30ft. high; return front 50ft. long. External walls are 3ft. to 4ft. thick.
1889. Premises for Miller & Beale, High Street, Camden Town - Shops corner of Rossllyn Hill and Downshire Hill - -	R. J. Beale Edward Monson, junr.	2,600	Red brick and Dumfries stone.
1891. London and South-Western Bank, Harrow Road, Willesden	Edward Gabriel	—	Lower portion polished Peterhead granite, upper portion Corsehill stone.
1892. Dairy Premises, Heath Street, Hampstead - - -	Keith D. Young	—	Residential flats over the shop. Carving on front by Mr. Thomas.
1893. Hampstead Electric-Light Station, Lithos Road, Finchley Road.	Arthur Ardron	7,350	Chimney shaft 140ft. high, 16ft. square at the base and 12ft. square at the springing of cap.
1898. Shops, 155 and 157, High Street, Camden Town - - -	Edward J. Bennett	—	
1898. London and South-Western Bank, Ltd., High Road, Kilburn.	Edmeston & Gabriel.	—	
1903. Central Electric Supply Co.'s Station, Grove Road - -	C. Stanley Peach & C. H. Reilly.	—	The buildings when completed will cover 7½ acres. Materials used are stock and blue bricks and York stone. Of fireproof construction throughout.

CEMENT COMBINE.

Last Year's Selling Prices.

THE fifth ordinary general meeting of the Associated Portland Cement Manufacturers (1900), Ltd., was held in London last week under the presidency of Mr. Frederick Anthony White, chairman of the company, from whose speech we take the following extracts:—

While England is the birthplace of Portland cement, and until comparatively recent years held a very real supremacy in the trade, scientific developments have within the last decade received a great impetus in some other countries: so that, if we were to hold our own it was absolutely essential that we should march with the times and that works constructed under the influence of older ideas should be brought up to date. There has, as you know, been a marked tendency on the Continent and in America to introduce labour-saving appliances, and it is obvious that this example is one which we were bound to follow if we were to effect economies that would alone enable us to meet the ever-increasing competition; for the war that, when I last spoke to you, was being waged upon our trade has not abated, and had we relied for profits only upon maintaining our selling price, while we were content to adhere to former methods of manufacture, we should have more to fear from your upbraiding for our want of enterprise than we have from critics who may assert that we have spent too freely. We have tried to keep in view the main consideration—that

Cheap Production

will carry the day, and to remember that, while it is true that finance is expensive it is equally true that it is still more expensive to manufacture at a higher price than your competitors.

The demand for cement has been somewhat slack of late than for some time and has involved a certain diminution of output; I am speaking of quite recent times—the last three or four months. This has occurred at an unusual period of the year; for trade is generally most active in the summer. You may possibly think that we have been too conservative in the matter of selling price; but this is not so. The general depression in trade appears to account for it.

Barges, Bricks and Buildings.

I have been speaking of the manufacture and sale of Portland cement; but while it is true as you know, that this cement is the staple of our business, I must not forget to remind you that the et ceteras which go to make up the total of our profits are not contemptible. We own a fleet of barges which carries the goods we sell and those we buy to and fro. We are considerable brick-makers, and we make and sell large quantities of lime, Keene's cement and whiting; while our estates department deals with the rentals

of our properties, buildings and cottages. From all these we earn a considerable revenue, which goes a long way towards providing the funds for our debenture stock interest, and contributes an element of additional stability not unappreciated by manufacturers who lack these advantages.

A Certain Brand.

Germane to the subject of sales is that question on which I spoke to you at length last year—namely, the manufacture at certain of our works of a brand of cement which is sold rather cheaper than the cement which we make at the majority of them. I told you that we had continued a trade that we found in existence, and how the demand for this brand had grown since the formation of the company, and of the asperity with which its success had been received by our competitors, some of whom had promoted legal proceedings against us on the ground of an alleged contravention by us of the Merchandise Marks Act in calling this cement Portland cement. As time went on it was forced upon our attention that the stir that had been made had not been without producing some effect; that our policy, which had been welcomed in the past, was leading now to some distrust, and that we must make up our minds to this attitude spreading amongst our customers if we continued the manufacture. Therefore, after long deliberation, we came to the conclusion that when contracts for the cement in question should have been executed we had better give up its manufacture. Of the works where this cement was chiefly made three have been closed, and when the manufacture ceases the other works will only be used for making Portland cement of the usual quality.

Obituary.

Mr. C. S. Cording, of Portsmouth, retired builder, who died on August 10th last, left estate of the gross value of £10,156.

Mr. G. A. Lawson, a well-known sculptor, died recently. His principal works included the Robert Burns statue at Ayr and its replica erected in Melbourne last year; the Wellington Monument, Liverpool; the Joseph Pease statue, Darlington; the James Arthur statue, Glasgow; besides many other public and private commissions for home and abroad.

Mr. C. J. Little, M.S.A. of Paddington, died recently. He was the son of a well-known builder in the borough, and served his apprenticeship as an engineer in the G.W.R. works at Swindon, subsequently becoming an inspector of engines and boilers. As the inventor of the "Absolute Block System of Signalling on Railways" his name was brought prominently before the public. He claimed that his invention saved more lives than any other in the world. Mr. Little was sixty years of age.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Classes in Quantities, Joinery, &c.

LONDON.—H. G. C. writes: "Where are classes held for taking-out quantities, construction of joinery-work, shop-fitting, case-making, &c.?"

Obtain syllabus from the secretaries of the Northampton Institute, Clerkenwell, and Northern Polytechnic, Holloway. Probably there are suitable classes at both places.

HENRY ADAMS.

Buildings to Measure in South-East London.

LONDON.—PEDIMENT writes: "Kindly name some almshouses, churches, libraries, &c., in the south-east of London suitable for the R.I.B.A. final examination—preferably Renaissance buildings."

I suggest Morden College, Blackheath, by Wren. A measured drawing of a doorway appeared as a centre plate in *THE BUILDERS' JOURNAL* for March 16th last, and the building has been illustrated in the A.A. Sketch Book by carefully measured drawings; it would probably suit your purpose admirably, as also would a portion of Greenwich Hospital, whether you selected the earlier work (by Inigo Jones) or the later. Failing permission to measure either of these, you might try the seventeenth-century almshouses known as "Trinity Ground" in the Mile End Road, also illustrated in the A.A. Sketch Book.

M.

Pumps.

EXETER.—M. writes: "Is the following rule correct? To calculate the weight of water to be lifted in using a pump, multiply the diameter of the pump barrel squared by the distance from the surface of the water in the well to the top of the valve in the pump bucket and the result by '34'. Taking this to be correct, how does the Torricellian principle apply 'that water will rise in vacuum 34ft. (approximately)'? In working a pump, as soon as the vacuum is created I take it the water will rise 34ft. (or, as in practice, 25ft.). If so, it does not appear to me that this height, raised by atmospheric pressure, should be calculated as being lifted when arriving at the weight of the water to be lifted and the power required. Another instance that seems to correspond with this is that the extreme limits of syphons are taken as 34ft. approximately. As soon as

the vacuum is created in the syphon it works of its own accord, no further power being required. If it does so in this case, why not in the other? Your answer to this question will be very helpful to me, and doubtless to other readers as well."

In calculating the weight of water lifted, the power exercised by atmospheric pressure is usually neglected in practice. A rule very generally employed to find (approximately) the quantity of water in gallons delivered by a pump per minute is:—Square the diameter of the pump in inches and multiply by .034 and the product by the speed of the pump. Many of the theoretical pump rules are found to be very much out in practice, owing to bad design, "slip," friction, "air lodges," &c. As regards the power required to raise a certain amount of water in a certain time to a given height in feet, I use the following rule:—Multiply the given number of gallons of water to be raised per minute by 10, and by the height the water has to be raised in feet, and divide the product by 33,000. Your deductions, I think, are correct.

M. POWIS BALE, M.I.C.E.,
Author of "Pumps and Pumping."

Certificates for Quantity Surveying.

SOUTH SHIELDS.—R. writes: "Is it possible for a building clerk to obtain certificates for quantity surveying. If so, what are the necessary steps to take and which are the best text-books? The subject is not taken at any local classes."

There are no certificates issued that would be of any value to you. If, as you say, there are no classes locally, your best course would be to take up a correspondence class, one of which is conducted by Mr. W. T. W. Castell, of 31, Great St. Helens, E.C., or, failing this, a study of books on the subject—for the elementary stage "Quantities and Quantity-taking" by W. E. Davis (Whitaker & Co.), 3s. 6d., and for the more advanced "Quantity Surveying" by J. Leaning (E. & F. N. Spon), the price of which is 25s. As a builder's clerk you would have many opportunities of making yourself fairly proficient—certainly sufficient to greatly improve your position in a builder's office. W. E. D.

Rooms for "Human Habitation."

LONDON.—W. & C. write: "We submitted plans of proposed new premises to the surveyor and sanitary inspector of a rural district council showing two stores (for packages), a coal store and a w.c. We have shown the height as 7ft. 6ins. in the clear, but the surveyor insists that the 'offices' referred to shall be 8ft. from floor to ceiling, as required by his council's by-laws, that 'rooms' used for human habitation shall be so. We demur, as there is no intention or any likelihood of the rooms being used for human habitation. In support of our opinion we quoted to the surveyor the definition of 'habitable' under the London Building Act, 1894. There is no definition of 'human habitation' in the local by-laws. Can the local authorities legally take a view of the meaning of 'human habitation' which is contrary to the usual view, and can they enforce that view?"

It is difficult to speak positively unless one has a copy of the local by-laws, but assuming that they are, as usual, based on the model of the Local Government Board, I am of opinion that the rural district council are within their rights in insisting upon the 8ft. minimum height. Even in the unlikely event that you are able to prove that the proposed erection is neither a "dwelling-house" nor a "domestic building," but a building of the "warehouse class," I much doubt whether you will be able to point out any section in the by-laws which justifies the council in accepting a lower standard of height on that account. F. S. I.

Construction Notes.

Articulations in Bridges.

It is common practice on the Continent nowadays, especially in Germany, to introduce hinges or pivots at the springings and also at the crown of arches, whether built of stone or concrete, with the object of concentrating the pressures at certain well-defined points and enabling the arch to make small movements, so as to adapt itself readily to the influence of external forces without developing cracks and fissures. The chief causes of such movements are changes of temperature, operations of striking centres, unavoidable unsymmetrical distribution of the rolling load. Recently in Würtemberg and Saxony the use of articulations has been frequent, and it has been carried out with complete success. All articulations of a metallic character (such as formerly favoured by some engineers) were completely excluded, and the same purpose was accomplished by means of a couple of arch stones or concrete voussoirs in direct contact with one another. One of the voussoirs is dressed or moulded to a convex cylindrical surface and the other to a plane or concave cylindrical form. In designing these articulations the formulæ of Hertz, which applies to the case of a cylinder of a length l and a radius r , in contact with a plane surface of the same material, is used. This formula gives the breadth b of the surface of contact bl which is produced when the articulation is subjected to a pressure equal to P , and is written—

$$b = 4 \sqrt{\frac{2}{\pi} a \left(1 - \frac{1}{m^2}\right) \frac{P}{l} r}$$

In this expression a denotes the co-efficient of elongation; the coefficient of elasticity would be equal to $\frac{1}{a}$. The symbol m

signifies the ratio between the longitudinal elongation and the corresponding transverse contraction. Hertz gives another formula respecting the rate of the maximum compression developed at the centre of the surface of contact. Putting S for this value, the formula becomes—

$$S = \frac{4P}{\pi bl}$$

Equating the two values for b in the above formulæ and solving for P , we obtain

$$P = S^2 2\pi a \left(1 - \frac{1}{m^2}\right) l r$$

In using this formula to calculate the pressure P to which an articulation may be subjected, the values of the coefficients a and m must be known, independently of that of S. Herr Bach, Professor at the Polytechnic School of Stuttgart, was given by the Minister of Public Works of Würtemberg the task of determining these values. He made experiments on granite articulations of the form of one dressed to a convex cylindrical surface and the other to a plane surface, cut with the greatest nicety and precision from one block procured from Wunsiedel, in Bavaria, weighing 162 lbs. per cub. ft. Eleven experiments were made in these articulations, by applying certain pressure to them, and examining its effect in the configuration of the surface of contact until rupture occurred. The surfaces gradually formed by the crushing of small pieces of the stones did not assume a regular rectangular shape, but it was found that the mean width of contact increased proportionately to the square root of the pressure, thus partly confirming the validity of Hertz's first formula, for if therein the other quantities be neglected, the value of b varies with the square root of P . The coefficient S was found not to be a constant quantity. If it were, it would follow from the third formulæ that the load P was proportional to

the radius r , whereas the value of r within ordinary limits has not this intimate relation. This fact Professor Bach attributes to the rupture of the stone being attended by lateral dilation, and not to any error in Hertz's formula. This was due to efforts of extension, while in the formula P is expressed as a function of the rate of compression. The fractures on failure occurred near the axis of the voussoirs, and in the direction of the line of pressure, and Herr Bach therefore thinks it would be advisable when articulations are of concrete to reinforce them to provide for the tensile stresses with hoops or metallic bands, which are best suited for strengthening solid bodies under stresses of compression. Theory and practice were found to disagree in the application of the third formula; cubes of granite, with sides equal to 3.2 ins. resisted on the average 9 tons per sq. in., and prisms 2.5 ins. by 3.5 ins. resisted 8.2 tons.

Bath Stone Quarries.

LAST week the Bristol Master Builders' Association inspected the extensive quarries at Corsham, by invitation of the Bath Stone Firms, Ltd. The stones are quarried to the south of Bath and the north-west of Wilts, where many thousands of tons have been extracted yearly from the beds on Combe Down, Farleigh Down and in the Box and Corsham districts. Box Ground is a thoroughly reliable weather stone of medium grain, and is unaffected by frost or situation. The beds run up to 4ft. 6ins. in depth, and the stone is occasionally quarried to 5ft. Monk's Park is unquestionably the most popular of the oolite series. It is compact, close grained, suitable for exterior work in any position, and carries great weight. Monk's Park is situated to the south of Corsham, and the stone is raised from the estate of Sir John Goldney, who resides in a mansion built from designs by Adam, the famous architect. Corsham Down stone is fine grained, even-textured, suitable for outside work and adapted for the building of seaside residences and in manufacturing towns. It is from this series the company are enabled to obtain stones up to 12ft. in length. Farleigh Down is a fine even-textured oolite of a warm tint. Beds from 3ft. to 4ft. are always being quarried. Farleigh Down is situated above the village of Bathford, and the stone is brought to the wharves by an incline of over a mile in length. Other quarries of the Bath Stone Firms are situated at Combe Down, Hartsham Park, Westwood, Bradford, Limpley Stoke and Kingsdown. In working for stone, the first question to determine is whether it shall be reached by an open or underground working; this depends upon the condition of the upper rag stones, as they must of necessity be passed through unless the stone can be reached by tunnelling on the face of an escarpment, such as at Box and Farleigh. One system of getting the stone prevails throughout the quarries. The freestone miner or quarryman has to commence his operations at the roof of the stone. This picking operation is effected by means of adze-shaped picks, on the heads of which longer handles are inserted as the work proceeds. In the Monk's Park and Corsham workings the stalls can, without danger, be driven a width of 25ft. to 30ft. In one quarry at Monk's Park the Bath Stone Firms have installed an ingenious machine worked by compressed air, for the purpose of picking the hard rock at the roof of the stone instead of by means of the adze-shaped picks, the working of which is of great interest to the visitor. It is difficult to arrive at the yearly output of these quarries, but one would not be far wrong in stating that nearly 3,000,000 cub. ft. of Bath stone is quarried annually.

Views and Reviews.

Picture Tiles for Hospital Wards.

Probably the first instance of picture tiles being used as a systematic decoration for a hospital ward was at the Children's Hospital, Paddington Green, the idea having been suggested by one of the surgeons. Since then they have been introduced into many hospitals, and their virtue in brightening up the wards cannot be too highly valued. In this matter Messrs. Doulton have taken a foremost position, and we must be thankful to them for numerous delightful pictures that now help to cheer the little prisoners in many a children's and babies' ward. These tile pictures can only be thoroughly appreciated by seeing them on the walls of a hospital—as at University College Hospital or St. Thomas's—but a number of excellent reproductions are shown in a neat book called "Pictures in Pottery" which has just been issued by Messrs. Doulton, prefaced by an interesting short history of decorative tile-work. Dealing with the three divisions into which most of the work can be grouped, namely, (1) *majolica* or *delft*, (2) *over-glaze* and (3) *under-glaze faience*, it is noted that in the first the painting is executed on a coating of white enamel which entirely clothes the body of the tile; in the second the painting is done in over-glaze or enamel colours on the glazed surface of a tile (this method being comparatively easy, and not requiring a very hard firing, consequently the colours are not always absorbed by the glaze and are only partially fixed, so that they are liable to wear away); while by the third method, under-glaze faience, the painting is done on the unfired (or "biscuit") tile, which is then immersed in the liquid glaze and fired at a great heat, sufficient to melt the glaze and join it permanently to the tile, imprisoning the painting under its hard transparent covering. Under-glaze faience is more difficult than over-glaze and the colour-palette is not so varied, as the greater heat required by it lessens the number of ceramic colours that can be used. But it is the only method for lasting effects, and the greater richness and depth of colouring render it pre-eminent.

The Alhambra.

This book, as the author frankly acknowledges in his preface, is mainly a collection of drawings and photographs of the Alhambra. It is sumptuously produced, there being no fewer than 108 coloured illustrations, and we have no doubt it will appeal to many who have visited or intend to visit that magnificent building at Granada. The name of Owen Jones must inevitably occur in connection with the Alhambra. With his friend, M. Jules Goury, the eminent French architect, he spent many years in studying the palace, and his splendid book cannot be surpassed: it is, however, a book altogether outside the range of the ordinary person, the large paper edition of it having been published at £36. All its coloured illustrations are now incorporated in the book under notice, which has, in addition, 250 photographic and other illustrations. Many of them are from exceedingly careful drawings, the fine detail of which is lost in the small-size blocks: this is especially the case with the sections of the building, the reproductions being of very little value except to show the general outline: the author would have done well, we think, to have reproduced these to a good size on fold-in plates.

Mr. Calvert likens the Alhambra to an exquisite opera which can only be appreciated to the full when one is under the spell of its magic influence; but as the witchery of an inspired score can be recalled by the sound of an air whistled in the street, so—it is his hope—the pale ghost of this Moorish fairyland may live again in the memories of travellers through the medium of his pictorial epitome. The photographic illustrations are good; and the inclusion of Mr. John F. Lewis's drawings, together with a series of pictures by Mr. James C. Murphy, who spent seven years in studying the artistic marvels of the Alhambra, greatly enhances the appearance of the book. The photographs show the palace as it stands to-day, but the drawings were made before the fire of September, 1890, which did so much damage. From a technical standpoint the book is well produced, being printed on good paper and bound in leather; but the half-tone blocks might have been of finer grain, as the detail, particularly important in this building, would then have been clearer.

"The Alhambra," by Albert F. Calvert. London: George Philip & Son, Ltd., 32, Fleet Street, price £2 2s.

PROPOSED MOSQUE FOR LONDON.

CONSIDERABLE attention having been drawn in the public press to the proposed mosque for London, we are glad to publish the following statement by the architect, Mr. Robert Williams, F.R.I.B.A., of 10, Clifford's Inn, W.C., together with two elevations of the building:—

"When carrying out work in Egypt, and in the study of Egyptian and Saracenic architecture for various periods during the last four years, I have had several conversations with sheiks and others as to the desirability of building a mosque in London, and last year I was asked if I could get a site in London. Since my return from Egypt just four months ago I have received definite instructions, including approximate dimensions, from an Egyptian pasha to prepare sketch designs for a mosque to be forwarded to the pasha, who was about to visit Constantinople intending to interview the Sultan on the subject. The sketch, while following the ornate character of Saracenic architecture, is simple, but is intended, if carried out, to be erected in good material."



PROPOSED MOSQUE FOR LONDON: WEST ELEVATION. ROBERT WILLIAMS, F.R.I.B.A., ARCHITECT.

Keystones.

¶ The Woolwich Memorial to Queen Victoria, a marble statue by Mr. F. W. Pomeroy, is to be placed in the entrance-hall of the municipal buildings, which will be ready for opening about May next.

¶ The Reconstruction of Aberdeen Town House is to be undertaken, according to a modified scheme costing about £3,500, by Mr. John Rust, the city architect, and Mr. Dyack, the burgh surveyor.

The old Buildings of Edinburgh.—Owing to many ancient and historic buildings having been demolished in Edinburgh during recent years to make way for modern tenements, the Town Council is considering the advisability of preparing a register of all buildings of historical or architectural interest, and of taking steps to have them preserved or restored.

¶ The Tapestry Works at Old Windsor were sold last Wednesday for £2,400. The property consists of twelve houses and a large central hall, and has an interesting history, being the outcome of an effort made, under the auspices of the late Duke of Albany, to revive the art of tapestry weaving in England. French instructors were engaged,

and some very beautiful specimens of the handicraft were woven upon the looms from designs by the most talented artists, some of which went to Windsor Castle and the mansions of those who encouraged the factory. Work gradually ceased after the death of its Royal supporter.

New Public Library, Art, Science and Technical School, Eastbourne.—The following firms did work at this building, illustrated in our issue for last week (Mr. Philip A. Robson, A.R.I.B.A., architect):—Messrs. Smith, Walker & Co., steelwork; Falkirk Iron Co., railings; J. Daymond & Son, carvings; Library Supply Co. and Lucy & Co., library fittings and steel shelving; Mr. Bessant (Eastbourne) and Mr. Henry (London), electric light and special fittings; Acme Co. (London), wood-block flooring; Geary, Walker & Co. (London), mosaic terrazzo; Wottons (Croydon), lead glazing; Pilkington & Son, ceramic work; Adamsez, Ltd. (Leeds), sanitary fittings; C. Smith & Sons (Birmingham), locks and gas fittings; The Bennet Furnishing Co., loose fittings; Merryweather & Co., fire hydrants and apparatus. The design carried out was not that which won in open competition—this was a much plainer one that conformed to the conditions. The sculptured panels are by Mr. H. C. Fehr,

of Fulham Road. The fittings on the library floor have been slightly varied from the plan as illustrated to give greater supervision.

The new City Hotel, Hull, has been erected in Lowgate for Messrs. Hewitt Brothers, brewers, of Grimsby. The architects were Messrs. Brodrick, Lowther & Walker, of Hull, and the contractors Messrs. Hebblethwaite & Wilson.

Competition for Carnegie Public Library, Whitehaven.—The awards in this competition have been made as follows:—1st, Messrs. Greig, Fairbairn & Macniven, 31, York Place, Edinburgh; 2nd, Mr. W. A. Mellon, City Chambers, York; 3rd, Mr. C. E. Hutchinson, 11, John Street, Bedford Row, W.C. The designs were exhibited at the Town Hall, Whitehaven, last week.

The Competition Reform Society have taken action in regard to the competition for a Carnegie free library at Benwell, Newcastle-on-Tyne, for which it is not intended to employ the successful competitor or any other architect, while the premiated plans are to become the property of the promoters, as notified in our issue for last week. The Competition Reform Society requests its members not to compete unless the conditions are satisfactorily revised.



PROPOSED MOSQUE FOR LONDON: SIDE ELEVATION. ROBERT WILLIAMS, F.R.I.B.A., ARCHITECT.

Modernizing the Town Hall at Newcastle.—Last week the New Town Hall Committee of the Newcastle Corporation decided to recommend scheme "A" for the rearrangement of the interior of the Town Hall. Under this scheme alterations would be effected without touching the concert hall. The new entrance would be from St. Nicholas' Square, opening into a corridor 12ft. wide and leading to two new staircases, one at each side of the corridor, each staircase having a lift. A new council-chamber would be provided to seat ninety-five, and the floors would be rearranged to accommodate the staff. The estimated cost is £21,653.

Bankruptcies.

[Abbreviations R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending September 23rd nineteen failures in the building and timber trades in England and Wales were gazetted.

H. GIRLING, builder and builders' merchant, Southall. J. R. HUGHES, joiner, Tanyfynwent. R.O. Sept. 15th.
W. B. DUGDALE, painter, South Shields. R.O. Sept. 13th. P.E., Newcastle, C.C., Oct. 28th, at 10.45.
EDWARDS & Co., late builders, Leytonstone. Adj. Sept. 10th.
O. HOWELLS, painter, plumber and house decorator, Lydney. R.O. Sept. 17th.
J. BUTTERFIELD & SON, house and estate agents, Burnley. P.E., Burnley C.C., Oct. 28th, at 10.45.
C. L. BEDFORD, estate agent, surveyor and valuer, Birmingham and London. R.O. Sept. 16th.
E. GRIFFITHS, builder and contractor, Penrhiwceiber. R.O. Sept. 14th.
E. JEVONS & Co., builders and contractors, Birkenhead. Adj. Sept. 15th.

A. A. HOLLAND, plumber, glazier, painter, paper-hanger and hot-water engineer, Belper. Adj. Sept. 12th.
E. OXLEY, architect and surveyor, Clay Cross. R.O. Sept. 17th.
COOPER & HAWARD, builders, Ipswich. Liabilities: £1,955 to unsecured creditors and £1,036 to fully-secured creditors.
J. WEARE, plumber Axbridge. R.O. Sept. 12th. First meeting, O.R.'s, Bristol, Sept. 28th, at 11.15. P.E., Guildhall, Wells, Oct. 4th, at 11.30.
BREARLEY & GELDER, stone merchants, Halifax. R.O. Sept. 15th. First meeting, O.R.'s, Halifax, Sept. 29th, at 3. P.E., Halifax C.C., Oct. 10th, at 2.
S. S. OLIVER, joiner and builder, Hull. First meeting, O.R.'s, Hull, Sept. 28th, at 11. P.E., Hull C.C., Oct. 24th, at 2.
W. T. CLARK, carpenter and builder, Newton Abbot. R.O. Sept. 13th. First meeting, O.R.'s, Exeter, Oct. 6th, at 10.30. P.E., The Castle, Exeter, same day, at 11.30.
R. DUCKWORTH, plumber and contractor, Manchester. R.O. Sept. 12th. First meeting, O.R.'s, Manchester, Sept. 30th, at 2.30. P.E., Manchester C.C., Oct. 31st, at 10.
D. HURST, sanitary engineer, Swinton (trading as the Full-way Pipe Couplings Co.), Victoria Street, London. Liabilities expected to rank for dividend £2,000. Failure attributed to inability to realize the proper value of patent rights in pipe-joint inventions.

ELECTRIC TIMBER SEASONING AND PRESERVATION Co., LTD., Charlton. Liabilities £8,997; assets £10,402; deficiency to shareholders £105,780. The company was formed to acquire the British patent rights in the Nodon-Bretonneau process of seasoning and preserving timber by electricity, and to commercially introduce the process into the United Kingdom.

New Companies.

MOORWOOD TILERIES, LTD. Capital: £3,000.
ALDWYCH SYNDICATE, LTD., property owners, builders and contractors, London. Capital £20,000 in £1 shares.
GRIFFITHS & Co. (CONTRACTORS), LTD. Capital: £20,000 in £1 shares.
ABERNEOL BUILDING Co., LTD. Capital: £3,000 in £1 shares.
GARRETT AUTOMATIC SPRINKLER, LTD. Capital: £50,000 in £1 shares.

WILSON ESTATE Co. (1904), LTD., Liverpool. Capital: £75,000 in £1 shares.

CHARLES DAVISON & Co., LTD., brick and tile manufacturers, Buckley and Ervloe, Flint. Capital: £10,000.
SIRCOMS, LTD., timber merchants and agents, sawmill proprietors, &c.

CHALLENGE FLOORING LTD., Bank Chambers, 92, Tooley Street, London, S.E. Capital: £5,000.

RELIANCE LIFT AND ENGINEERING Co., LTD., Sentinel Iron Works, Joseph Street, Bradford. Capital: £3,000.

JOHN SCURR & Co., LTD., Ironmongers, engineers, builders, &c., 53, High Street, Poplar, E. Capital: £2,000 in £1 shares.

NEW GRIFFIN FOUNDRY Co., LTD., Ironfounders, contractors stove-grate manufacturers, &c., Stephenson Street, Birmingham. Capital: £20,000 in £1 shares.

HAMPSON, CHAMBERS & Co., LTD., stone merchants, masonry contractors, dealers in builders' materials, &c., Plough Yard, Shoreditch, and 16, George Street, Camberwell. Capital: £15,000 in £1 shares.

CORRIG, LTD., builders, contractors decorators, dealers in builders' materials, &c., Crosby Buildings, Crosby Square, E.C., and 35 and 37, Flockton Street, Bermondsey, S.E. Capital: £1,000 in £1 shares.

BUTTERWORTH & SONS, LTD., painters, decorators, gas and water fitters, &c., 32, High Street, Lees, near Oldham, and 179, Lees Road, Oldham. Capital: £2,000 in £1 shares.

Coming Events.

Friday, September 30.

ARCHITECTURAL ASSOCIATION.—Annual General Meeting at 7.30. The President's Address and Distribution of Prizes.

SANITARY INSTITUTE (Lectures and Demonstrations for Sanitary Officers, Part I.).—Mr. J. Priestley, B.A., M.D., on "Duties of a Sanitary Inspector."

Saturday, October 1.

NORTHERN ARCHITECTURAL ASSOCIATION.—Visit to Council Schools, Heaton, and St. Gabriel's Church, Newcastle-on-Tyne, at 3.

BRITISH INSTITUTE OF CERTIFIED CARPENTERS.—Monthly Meeting at Carpenters' Hall at 6 p.m.

Tuesday, October 4.

ARCHITECTURAL ASSOCIATION.—Preliminary Meeting, School of Design, at 7 p.m.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Sept. 29	Southwark, S.E.—Building Area	Guardians	G. W. Stevenson, 13 and 14 King Street, E.C.
" 29	Antrim—Cottages	Rural District Council	J. Clark, Clerk's Office, R.D.C., Antrim.
" 29	Llanfrechfa, Mon.—Alterations to Cottage	F. J. Mitchell	W. H. D. Capel, Architect, Church Street Chambers, Cardiff.
" 29	Ilanfrechfa, Mon.—Alterations to School	—	W. H. D. Capel, Architect, Church Street Chambers, Cardiff.
" 29	Portsea—Store	Portsea Island Co-op. Society	G. E. Smith, Victoria Road N., Southsea.
" 30	Portluan, near Fowey—Coastguard Buildings	Admiralty	Superintending Civil Engineer, H.M. Dockyard, Devonport.
" 30	Dinnington Colliery, near Newcastle-on-Tyne—Premises	Cramlington Dist. Co-op. Society	J. G. Crome, 21 Grainger Street, W., Newcastle-on-Tyne.
" 30	Grassington, Skipton—House, &c.	—	James Hartley, Architect, Skipton.
" 30	Swineshead—Schoolroom, &c.	—	James Rowell, Architect, Church Lane, Boston.
Oct. 1	Byfleet, Surrey—Classrooms, &c.	Management Committee	St. Mary's Schools, Byfleet, Surrey.
" 1	Cardiff—Re-roofing	Thomas Owen & Co., Ltd.	J. W. Rodger, 14 High Street, Cardiff.
" 1	Walthamstow—School	Urban District Council	H. Prosser, Education Committee Offices, High St., Walthamstow.
" 3	Harringay, N.—Villas	—	Frith, Garland & Co., 70 Grand Parade, Harringay Park, N.
" 3	Friern Barnet—Public Offices	Urban District Council	E. J. Reynolds, Surveyor to Council, Council Chambers, Beaconsfield Road, Friern Barnet, N.
" 3	Blackrock—Library, &c.	Urban District Council	G. L. O'Connor, 198 Great Brunswick Street, Dublin.
" 3	Bandon—Twenty-six Cottages, &c.	Rural District Council	A. Haynes, Clerk to Council, Council Room, Workhouse, Bandon.
" 3	Prestwich—Transformer Station	Electricity Committee	Borough Engineer, Town Hall, Salford.
" 3	Napsley, near St. Albans—Cottages	County Council	Young & Brown, 104 High Holborn, W.C.
" 3	Erith, Kent—Car Sheds, &c.	Urban District Council	W. Egerton, 12 Queen's Road, Erith.
" 3	Dublin—Houses	Great Northern Ry. Co. (Ireland)	W. H. Mills, Engineer-in-Chief, Amiens Street Terminus, Dublin.
" 3	Kirkby Lonsdale—Additions, &c.	—	J. F. Curwen, 26 Highgate, Kendal.
" 3	London, S.E.—Flooring, &c.	Lewisham Public Baths Committee	Surveyor, Town Hall, Catford.
" 3	Gravesend—Alterations, &c., to Cubicles	Hospital Committee	Secretary, Hospital, Gravesend.
" 4	Barking—Workmen's Dwellings	Urban District Council	C. J. Dawson, East Street, Barking.
" 4	Bolton upon Dearne, Yorks—Offices, &c.	Urban District Council	J. W. Wilson, Architect, Hoyland.
" 4	Perranporth, Cornwall—Cottages	Great Western Railway Co.	Engineer, North Road Station, Plymouth.
" 4	Sheffield—Police Station	Watch Committee	C. F. Wike, City Surveyor, Town Hall, Sheffield.
" 4	Chatham—School	Education Committee	H. H. Dunstall, Bank Chambers, Railway Street, Chatham.
" 5	Edinburgh—Washing Hall, &c.	Corporation	Public Works Office, City Chambers, Edinburgh.
" 5	Poplar—Public Library	Council	J. R. Hunt & Co., Bridge House, 181 Queen Victoria Street, E.C.
" 5	Wandsworth—Alterations, &c., to School	Guardians	C. A. Sharp, 11 Old Queen Street, Queen Anne's Gate, S.W.
" 5	Alnwick—Alterations to Shed	Guardians	Workhouse, Alnwick.
" 5	Manorcunningham, Ireland—Additions, &c.	Lennard's, Ltd.	W. S. Pinkerton, 11 Ship-quay Street, Londonderry.
" 6	Tonypandy—Rebuildine Premises	Corporation	R. S. Griffiths, Excelsior Buildings, Tonypandy.
" 7	Southwold, Suffolk—Dwellings	Guardians	E. R. Cooper, 1 Market Place, Southwold.
" 8	Birkenhead—Laundry Buildings, &c.	Corporation	E. Kirby, 5 Cook Street, Liverpool.
" 8	Exeter—Car Depot	Renfrew and Clydesdale Joint Hospital Board	T. Moulding, City Engineer, 7 Southernhay West, Exeter.
" 8	Blawart Hill—Brickwork	Metropolitan Railway Co.	Stewart & Paterson, 14 Blythswood Square, Blawart Hill, Glasgow.
" 8	London—Stores	Urban District Council	R. H. Selbie, Secretary's Office, 32 Westbourne Terrace, W.
" 11	Carmarthenshire—Additions, &c.	Commissioners	W. D. Jenkins, Shire Hall, Carmarthen.
" 11	London—Erection of Front Block, Northern District Post Office	—	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 12	Loudwater—Cottages	Bucks County Council	R. J. Thomas, Surveyor, County Hall, Aylesbury.
" 12	Kilkeel—Cottages	Rural District Council	Engineer to Council, Castlewellan.
" 12	Chingford, Essex—Extension to Hospital	Walthamstow U.D.C.	G. W. Holmes, Town Hall, Walthamstow.
" 14	Osmington, near Weymouth—Coastguard Buildings	—	Superintending Civil Engineer, H. M. Breakwater Works, Portland.
" 14	Abergavenny—Free Library Reading-Room	Urban District Council	B. J. Francis, Architect, Abergavenny.
" 31	Wallasey—Public Offices	—	H. W. Cook, Public Offices, Egremont, Cheshire.
No date	London, S.W.—Block of Shops	—	Palgrave & Co., Architects, 28 Victoria Street, S.W.
"	Leamington—Alterations, &c., to Hotel	—	Brown & Barrow, 12 Norfolk Street, Strand.
"	Walham Green—Pulling down Old Buildings	—	W. H. Gibbs & Co., 2A New Broadway, Ealing, W.
"	Barnsley—School	Education Committee	E. W. Dyson, 14 Market Hill, Barnsley.
ENGINEERING:			
Sept. 29	London, W.C.—Gasholder Tank	First Garden City, Ltd.	C. Hunt, 15 Victoria Street, S.W.
" 29	Pontardawe, Wales—Stone Bridge	Rural District Council	Surveyor's Offices, Herbert Chambers, Pontardawe.
" 30	Hull—Wiring, &c.	Corporation	A. E. White, City Engineer, Town Hall, Hull.
" 30	Tynemouth—Dynamo	Corporation	C. Turnbull, Electrical Engineer, Elec. Works, North Shields.
" 30	Cudworth, Yorks—Liquefying Tanks, &c.	Urban District Council	Fairbank & Son, Lendal Chambers, York.

Complete List of Contracts Open.—continued.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
ENGINEERING—cont.			
Oct. 1	Earsdon, near Newcastle-on-Tyne—Waterworks	Urban District Council	J. R. MacMillan, Shiremoor.
" 1	Manchester—Turntable	Tramways Committee	John McElroy, 55 Piccadilly, Manchester.
" 3	Canterbury—Electric-Light Fittings	Drainage Committee	A. C. Turnley, City Surveyor, Guildhall Street, Canterbury.
" 3	London, W.—Steam Road-roller and Scarifier	Paddington Borough Council	A. W. J. Russell, Town Clerk, Town Hall, Paddington.
" 4	Ilford—Plant	Urban District Council	J. W. Benton, Town Clerk, Town Hall, Ilford.
" 4	London, S.W.—Plant	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
" 4	London, S.W.—Pumps, Motors, &c.	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
" 4	London, W.—Reconstructing Bridge	London County Council	Maurice Fitzmaurice, County Hall, Spring Gardens, S.W.
" 4	London, S.W.—Electric Car Traversers	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
" 4	London, S.W.—Condenser, Piping, &c.	London County Council	Clerk, L.C.C., Spring Gardens, S.W.
" 5	Mortlake—Pumping Machinery	Richmond Main Sewerage Board	W. Fairley, Engineer to Board, West Hall Road, Kew Gardens.
" 5	Portnoo, Co. Donegal—Pier	Board of Public Works	H. Williams, Office of Public Works, Dublin.
" 6	Brailes, Banbury—Extension, &c., of Water Supply	Rural District Council	E. R. Gander, Inspector of Nuisances, Brailes, Banbury.
" 6	Weymouth—Wiring	Town Council	Borough Electrical Engineer, Sunnysbank, Westham.
" 7	Cladnageragh, Ireland—Timber Jetty	—	H. Williams, Secretary, Office of Public Works, Dublin.
" 8	Blawart Hill, Glasgow—Excavations	Renfrew and Clydesbank Joint Hospital Board	Stewart & Paterson, 14 Blythswood Square, Blawart Hill, Glasgow.
" 10	Ipswich—Boiler	Tramways Committee	Kennedy & Jenkin, 17 Victoria Street, S.W.
" 10	Ludlow—Sewage-disposal Works	Town Council	J. H. Williams, Town Clerk, Ludlow.
" 10	Pontypridd—Steam Motors	Urban District Council	P. R. A. Willoughby, Engr. to Council, Council Offices, Pontypridd.
" 11	London, S.W.—Steam-exhaust Pipes	L.C.C.	County Hall, Spring Gardens, S.W.
" 12	Lerwick Harbour—Extension to Harbour	Harbour Trustees	J. Barron, Central Chambers, 216 Union Street, Aberdeen.
" 12	Espinar, Spain—Electric Lighting	—	Offices of the Alcaldia Constitucional of Espinar.
" 12	Middlesex—Bridge Work, &c.	County Council	H. T. Wakelam, County Engineer, Guildhall, Westminster.
" 22	Bahia, Brazil—Railway	—	Secretary of Agriculture, Bahia, Brazil.
1905.			
March 31	Shanghai—Electric Tramways	—	Pook & Co., Agents for Municipality of Shanghai, 63 Leadenhall Street, E.C.
IRON AND STEEL:			
Oct. 1	Earsdon, near Newcastle-on-Tyne—Water Mains	Urban District Council	J. R. MacMillan, Shiremoor.
" 3	Skipton—Pipes	Urban District Council	G. H. Hill & Sons, Civil Engineers, 3 Victoria Street, S.W.
" 5	Dublin—Steelwork	Great S. & W. Ry. Co	Office of Company's Engineer, Inchicore, Dublin.
" 7	Hull—Pipes, &c.	Corporation	F. I. Bancroft, Engineer, Alfred Gelder Street, Hull.
No date	Lowestoft—Steel Pipe	—	Mills & Sons, Artesian Well, Lowestoft.
PAINTING AND PLUMBING:			
Sept. 29	Christiania—Oils, &c.	Norwegian State Railway	Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
Oct. 5	Shoreditch—Painting, &c.	Guardians	F. J. Smith, Parliament Mansions, Victoria Street, S.W.
" 8	Blawart Hill, Glasgow—Plumber and Painting Work	Renfrew and Clydesbank Joint Hospital Board	Stewart & Paterson, 14 Blythswood Square, Blawart Hill, Glasgow.
ROADS AND CARTAGE:			
Sept. 29	Portishead, Bristol—Street Works	Urban District Council	Surveyor, Council Offices, Portishead, Bristol.
" 30	Chesterfield—Asphalting	Corporation	Borough Surveyor's Office, Saltergate, Chesterfield.
" 30	Southwam, Yorks—Granite, &c.	Urban District Council	R. W. Evans, Commercial Bank Chambers, Halifax.
Oct. 1	Saffron Walden—Granite Macadam	Corporation	A. H. Forbes, Borough Surveyor, Saffron Walden.
" 1	Lymington—Granite	Town Council	F. Hill Parr, Borough Surveyor, Lymington.
" 1	Lymer, Middlesex—Forming, &c.	Parish Council	J. Gurney, Clerk, Down's Farm, Pinner.
" 1	Wakefield—Street Works	Council	City Surveyor, Town Hall, Wakefield.
" 3	London, S.E.—Kerbing	Lewisham Borough Council	Surveyor's Department, Town Hall, Catford.
" 3	Guildford—Granite	Town Council	G. G. Mason, Borough Surveyor, Tuns Gate, Guildford.
" 3	London—Gravel	County Council	Parks Department, 11 Regent Street, W.
" 4	Ilstington, Devon—Road	—	R. A. Rogers, A.S.I., Newton Abbott.
" 4	Farnham, Surrey—Granite	Urban District Council	R. W. Cass, Surveyor, Council Offices, Farnham.
" 4	Brentford—Roadway, &c.	Urban District Council	Nowell Parr, Clifton House, Boston Road, Brentford.
" 4	Leiston, Suffolk—Road Works	Urban District Council	J. Baldry, Snape Road, Leiston.
" 4	Bolton-upon-Dearne, Yorks—Street Works	Urban District Council	J. Ledger Hawksworth, Clerk, Council Office, Bolton-upon-Dearne.
" 4	Her Bay Road Works	Urban District Council	F. W. J. Palmer, Surveyor to Council, Town Hall, Herne Bay.
" 5	Canthampton, Surrey—Materials	Urban District Council	W. Willis Gale, Council Offices, High Street, Carshalton.
" 5	Pontliff—Road, &c.	—	Gustard & Waddington, Tredgar Chambers, Bridge St., Newport.
" 5	Purley, near Croydon—Roadmaking, &c.	Croydon R.D.C.	R. M. Chart, Surveyor, Town Hall, Croydon.
" 6	Brighton—Granite Kerb, &c.	Town Council	Francis J. C. May, Town Hall, Brighton.
" 7	Whickham, Durham—Materials	Urban District Council	T. Lambert, Clerk, Town Hall, Gateshead.
" 7	Pontypridd—Road Widening	Urban District Council	P. R. A. Willoughby, Engineer to Council, Pontypridd.
" 10	Hanwell—Paving	Urban District Council	S. W. Barnes, Council Offices, Church Road W., Hanwell.
SANITARY:			
Sept. 29	Southwark, S.E.—Drainage, &c.	Guardians	G. D. Stevenson, 13 and 14 King Street, Cheapside, E.C.
" 29	Thorne, Yorks—Scavenging	Rural District Council	J. Stanley, Surveyor, The Green, Thorne.
Oct. 1	Walmer, Kent—Sewer	Urban District Council	H. W. Barker, Surveyor, Council Offices, Walmer.
" 1	Walmer, Kent—Drainage Works	Urban District Council	H. W. Barker, Surveyor, Council Offices, Walmer.
" 4	London—Sewers, &c.	London County Council	Maurice Fitzmaurice, County Hall, Spring Gardens, S.W.
" 4	London, S.W.—Lime, &c.	London County Council	Maurice Fitzmaurice, County Hall, Spring Gardens, S.W.
" 6	Purley, near Croydon—Sewering	Rural District Council	R. M. Chart, Surveyor, Town Hall, Croydon.
" 6	London, S.W.—Disinfecting Station	Wandsworth Borough Council	Surveyor's Office, 215 Balham High Road, S.W.
" 10	Hanwell—Sewering	Urban District Council	S. W. Barnes, Council Offices, Church Road W., Hanwell.
" 10	Todmorden—Sewage Works	Corporation	J. A. Heap, Town Hall, Todmorden.
" 10	Ludlow—Sewage-disposal Works	Corporation	J. H. Williams, Town Clerk's Office, Ludlow, Salop.
" 11	Church Stretton, Salop—Sewers, &c.	Urban District Council	J. Mansergh & Sons, 5 Victoria Street, Westminster, S.W.
" 11	Oakenkate, Salop—Drainage Work	Urban District Council	R. E. W. Berrington, Bank Buildings, Wolverhampton.
" 17	Douglas, Isle of Man—Erection of Lavatories	Harbour Commissioners	Commissioner's Office, Coronation Chambers, Douglas.
" 24	Larne, Ireland—Sewerage Works	Rural District Council	J. W. Whiteford, Engineer, 28 Waring Street, Belfast.
No date	Selby—Pipeclaying, &c.	Urban District Council	Surveyor's Office, Town Hall, Selby.
"	Leamington—Sanitary Work, &c.	—	Brown & Barrow, 12 Norfolk Street, Strand.
TIMBER:			
Oct. 4	London, W.—Timber	Great Western Railway Co.	G. K. Mills, Secretary, Paddington Station, W.

List of Competitions Open.

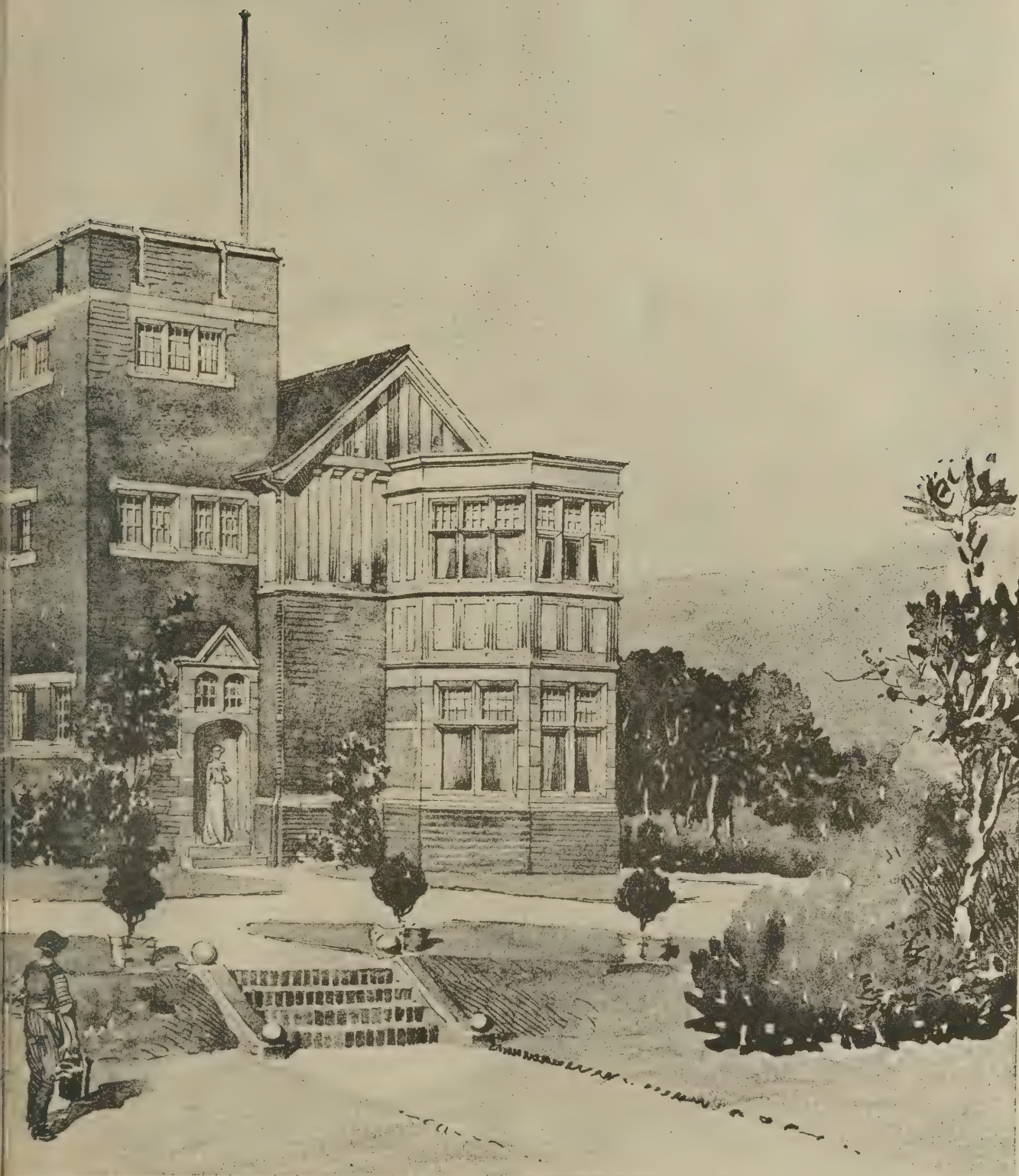
DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.*	DEPOSIT REQUIRED FOR CONDITIONS, &c.*	FROM WHOM PARTICULARS MAY BE OBTAINED.
Sept. 30	London, N.W.—Mortuary	—	—	Superintendent Hampstead Cemetery, West Hampstead, N.W.
" 30	Egremont, Cheshire—School	—	£1 is.	H. W. Cook, Public Offices, Egremont, Cheshire.
" 30	Benwell, Northumberland—Public Library	£75, £40, £25.	£1 is.	W. P. Pattison, Surveyor to Council, Atkinson Road, Benwell.
Oct. 1	Uxbridge—Workhouse Buildings	Successful Architect to be appointed.	£1 is.	C. Woodbridge, 38 High Street, Uxbridge.
" 31	Egremont, Cheshire—Public Offices	£250, £75, £50.	£2 2s.	H. W. Cook, Public Offices, Egremont.
1905.				
Dec. 31	Spezia—Drainage Scheme	£400	—	Ill Signor, Sindaco della Spezia
No date	Glasgow—Memorial	—	—	J. MacDonald, 4 Carlton Place, Glasgow.

* Where a dash is given it does not necessarily mean that no premiums are offered and no deposit is required, but that we have not been informed what these are (if any).

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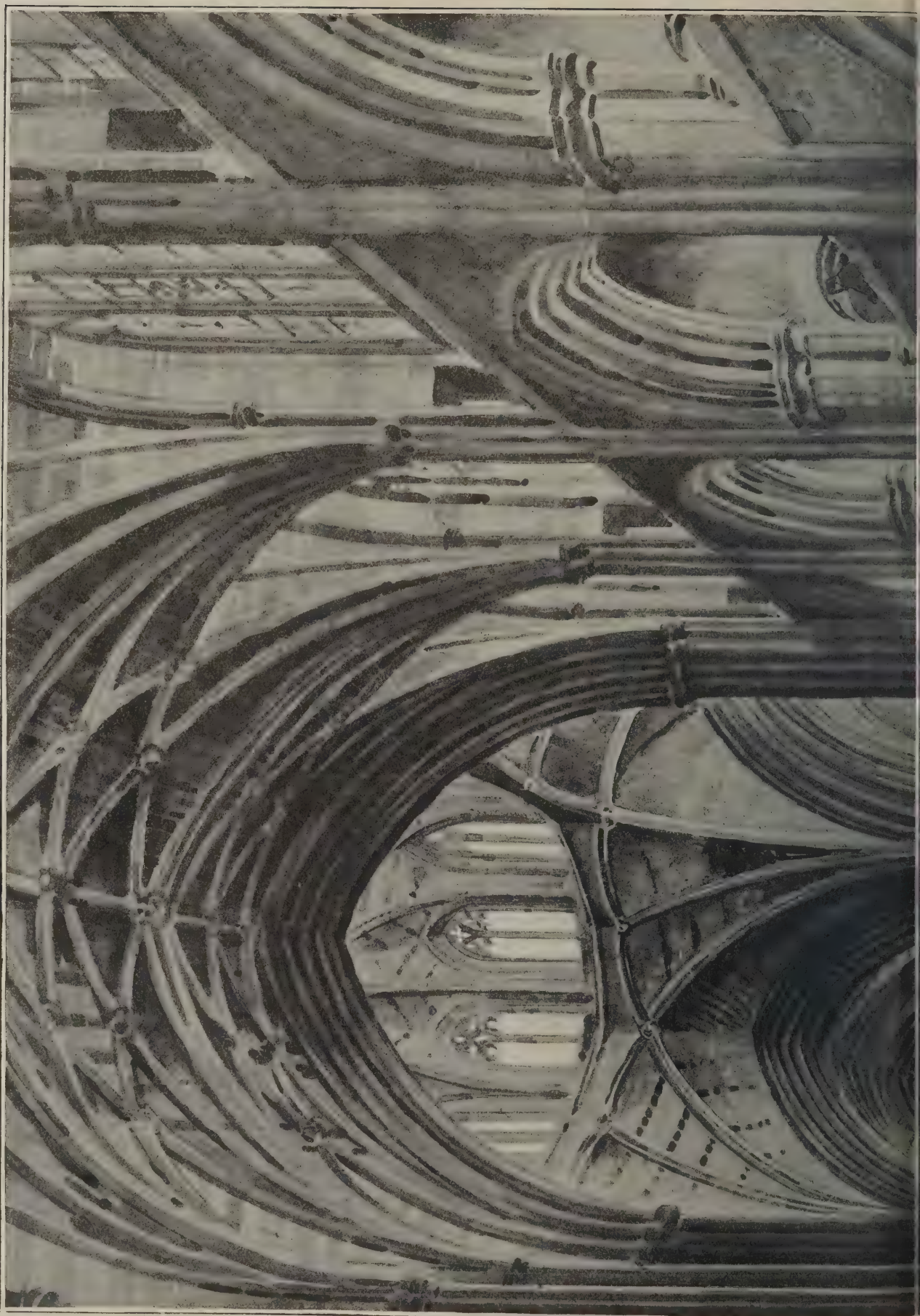
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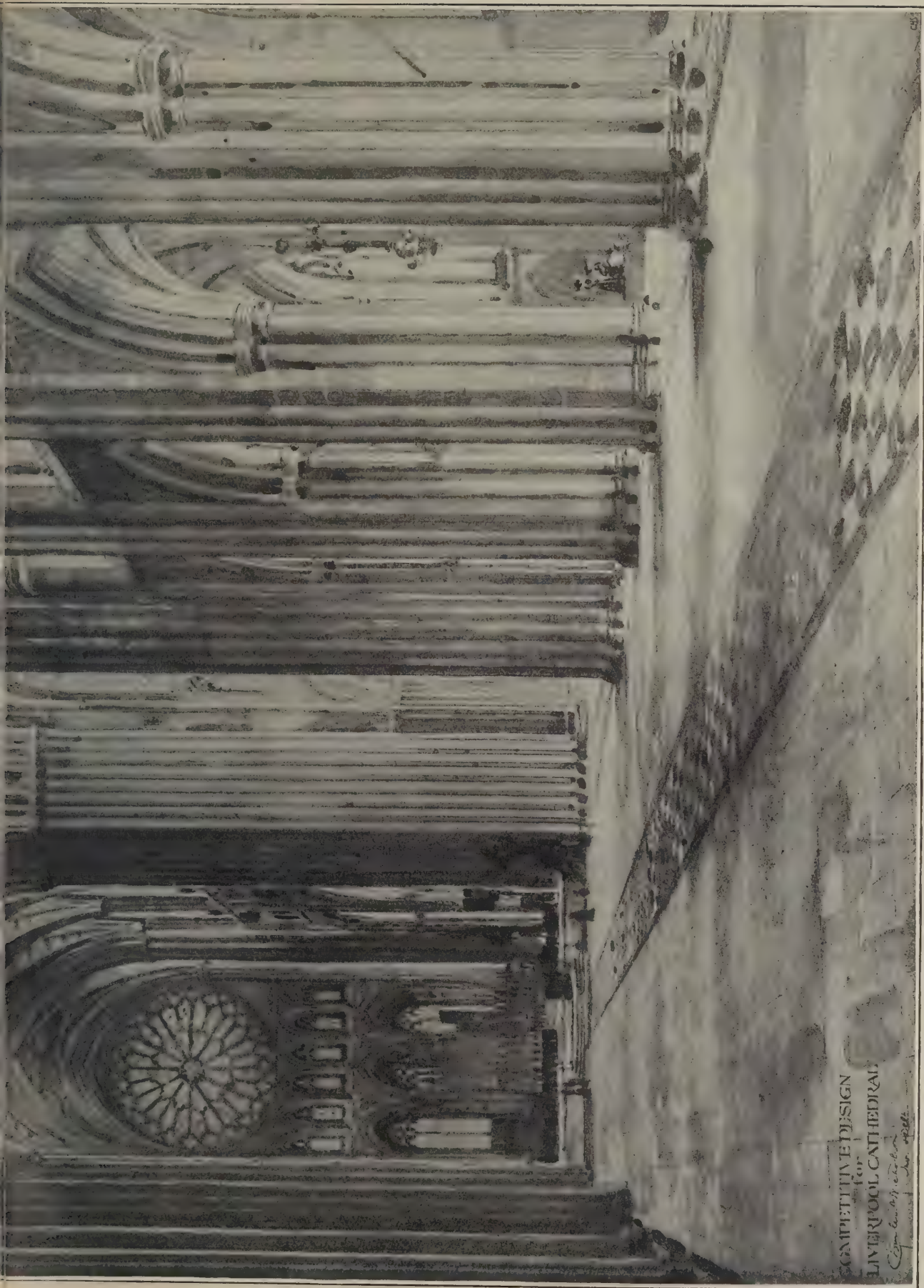
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*Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, October 5th, 1904.*





COMPETITIVE DESIGN
FOR
LIVERPOOL CATHEDRAL

By
J. H. STUBBS

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

October 5, 1904. Vol. 20, No. 504.

6, Great New Street, Fetter Lane, E.C. 4

Summary.

A mortuary should be arranged so that one side abuts on a passage from which the interior may be viewed by the jury men through a plate-glass window. (Page 180.)

The reconstruction of the Architectural Association's new premises in Tufton Street, Westminster, has cost £10,000, and £5,000 is still needed. Mr. Guy Dawber delivered his presidential address to the Association on Friday, in the course of which he referred to the lack of uniformity in modern street architecture, the needs of architectural education, the harmful effect of stringent building by-laws in country districts and the development of the suburbs. (Page 175.)

After having kept the building trade on Tees-side at a standstill for six months, the dispute with the bricklayers' and plasterers' labourers is now settled. (Page 178.)

The sum of £10,500 is needed to restore the Bell Harry Tower of Canterbury Cathedral, which is badly decayed, though there are no cracks in the main walls. (Page 185.)

A Croydon builder was recently fined £2 and costs for using bats instead of bricks for the walls of two houses. In one case there were eleven whole bricks where there should have been sixty, and in another piece of work there were forty-eight bats to one stretcher. (Page 178.)

The sea wall at Galveston, Texas, the greatest structure of its kind in the world, has been completed. It is 17,593 ft. long and has cost £239,623. (Page 178.)

Three new reservoirs at Halifax are now in course of construction, but they will not be completed till 1907. The estimated cost is £250,000. (Page 185.)

The 3½ millions of normal candles of light produced by electricity in Berlin—i.e., 500,000 incandescent lamps of 25 candles, and 18,000 arc lamps of 1,000 candles each—would, in the case of energy stored up in the carbon being entirely utilized, require only $\frac{1}{400}$ horse-power, namely, the strength of a little child. (Page 179.)

The 500th anniversary of the death of William of Wykeham was marked by a special commemoration service in the chapel of Winchester College last week. (Page 185.)

Mr. R. G. Allanson-Winn, M.I.C.E.I., advances the new theory that where the encroachment of the sea is steady and the material soft, exposed groynes will not necessarily arrest the encroachment. (Page 179.)

No Judge of Architecture. QUITE a burst of criticism has taken place in regard to the cottage Mr. Justice Grantham wishes to build at Barcombe. The daily press, recently awakened by Mr. Wilfrid Scawen Blunt to the anomalous and oppressive nature of local by-laws, has seen in this case but another example of senseless regulations. The facts, however, are very different. Sir William, it appears, built four cottages at Barcombe just before the new by-laws of the Chailey Rural District Council came into force a year ago. These cottages, he claims, were erected in conformity with the requirements of the by-laws subsequently passed. Latterly he has desired to erect another cottage attached to, and an exact counterpart of, the other four—this on the suggestion of an artist friend staying with him last autumn, "who pointed out how the appearance of the four would be improved by adding another with some windows and doors facing the south, where there is one of the prettiest views in Sussex." The rural council, however, had the temerity to request him to stop the building of the cottage until plans had been deposited and found to conform with their by-laws. To this he demurred, but eventually did submit plans. As a result, certain things which did not comply with the by-laws were pointed out to him. In reply, Sir William explained that the plans had been hurriedly drawn, and submitted fresh ones. These were again found by a member of the Plans Committee of the council to be at variance with a number of the by-laws, and this member also expressed the opinion that they were not drawn clearly enough to indicate whether the intention was to comply with the by-laws or not. Sir William, in an interview with the council, said he made the plans, as he thought, in conformity with the regulations in every respect—and he was used to interpreting these things judicially; but they were done in a hurry, as he wanted to get the roof on before the winter set in. In his view a district council were not entitled to ask in a case like this for such a plan as a builder would have to build by, drawn by a surveyor or an architect; all they should require was a plan which enabled them to see that the cottages were proposed to be built within their by-laws. They might say this was his hobby. Suppose it were, it was not a bad one. He preferred to prepare the plans himself, and if he was compelled to call in architects and surveyors it would not be possible for him to go on with his hobby. Now, fortunately, we are in a position to

pass an opinion, by reason of these particular plans having been illustrated. A member of the council rightly said that they were of the sort one would expect from a school-boy, and that it would puzzle any architect to understand the block plan sent in. Admitting the right of the council to have plans submitted, it is apparent these must be intelligible. Justice Grantham, this "judge-architect" as the papers call him, may think architecture would make a fine hobby, but it is unfortunate for him that the authorities of this country are of the opinion that matters affecting the health and lives of the community should be controlled. It may be "grandmotherly" legislation and interference with the liberty of the subject, but we believe in it. Until we get registration we shall not be free from the incompetent amateur. We do not see what qualifies the legal fraternity to practise as architects; but Lord Grimthorpe and Justice Grantham doubtless know. We hardly follow the argument that because the latter has been building cottages and farm buildings for forty years under his own personal direction, or that he is used to interpreting by-laws judicially, he is therefore competent as an architect. A man may select, wear and even personally direct the construction of his own clothes, but it does not imply he is a good tailor.

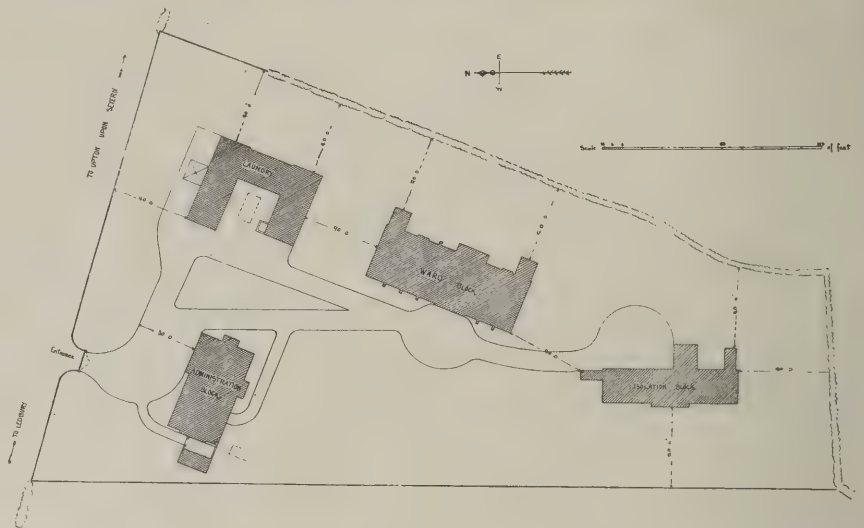
A Record of Sound Builders. As we have pointed out before, it often happens that an architect has a commission to execute in a district unfamiliar to him, and he is then at a loss to know what builder to employ or what contractors he should ask to tender: in fact, he may already have had the unfortunate experience of being placed in the hands of an unscrupulous man, or one not financially sound. The benefit therefore of being able to consult such a list of builders as we shall publish once a month, giving particulars of jobs they have carried out, will be apparent to everyone. Our employment register has been found of great service to a vast number of employers and employed, and this has encouraged us to start the scheme referred to above. The advantage of bringing the architect and builder into touch with one another in this way will, we are sure, be much appreciated—indeed, we have received a large number of expressions of approval from well-known architects and builders. The directory is now in active preparation, and if any builder has not yet sent for particulars of the scheme he should do so without delay.



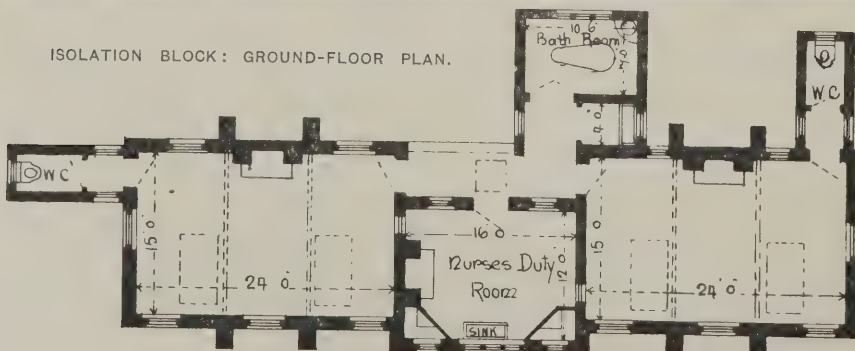
ISOLATION HOSPITAL UPTON-ON-SEVERN: GENERAL VIEW. G. LEWIS SHEPPARD A.R.I.B.A., ARCHITECT.

ISOLATION HOSPITAL, UPTON.

THE site of this hospital is about $1\frac{1}{2}$ acres in area and is situated on the Upton and Ledbury Road, about $1\frac{1}{4}$ miles from Upton. It is sheltered from the north and east, and commands extensive views of the Malvern Hills. Up to the present three blocks of buildings have been erected, a fourth being kept in abeyance until the requirements of the district necessitate its erection. The administration block, illustrated on the opposite page, is placed facing the main entrance. On the ground floor are the dining-room, 18ft. by 14ft. (from the bay window of which the matron can command the laundry and ward blocks), surgery 14ft. by 8ft. for dispensing medicines, &c., kitchen 14ft. by 14ft. 6ins., scullery, larder and store-room. A small yard is approached from the scullery, with out-offices, &c. On the first floor are six well-lighted and cheerful bedrooms, each having a fireplace. A bath-



ISOLATION BLOCK: GROUND-FLOOR PLAN.



room, with bath supplied with hot and cold water, is also provided. The laundry block (see p. 176) is situated opposite the administration block and is near the road. The accommodation consists of a wash-house fitted with all necessary appliances by Messrs. Summerscales & Sons, Keighley. A drying closet is provided in the ironing-room. The disinfecting-rooms are fitted with a Thresh disinfecter. A mortuary, ambulance-house and coal and tool houses are also included in this block. The ward block (also illustrated on p. 176) provides accommodation for ten beds in two wards, which are heated with Musgrave's central stoves. The floors have been laid with wood blocks by Messrs. Ellis, Geary & Co., of London. Between the wards is a nurses' duty-room, 14ft. 6ins. by 13ft. fitted with cupboards, sink, range, &c. At the back of the range in the passage is a large linen cupboard heated by the hot-water cylinder. The bathroom is about 8ft. 6ins. square and includes a lavatory basin and movable bath. There is a hot-water service in each of the blocks, hot water being laid on to the various sinks, lavatories, &c. This work has been carried out by Messrs. R. & C. Marshall, of Cheltenham. The water-supply is obtained from a well, the water being forced up to a large cistern fixed in the roof of each block, and then gravitated to the several sanitary fittings; in addition, there are two large tanks built in the ground for storing rainwater. Two systems of drains are installed, namely, for sewage and rainwater. The sewage drains are disconnected from each block and the sewage is discharged into a septic tank built at the lower end of an adjoining field, and thence through coke-

breeze filters to the outfall. Externally the walls of the several blocks are faced with dark red bricks and grey Portland-cement stucco. The roofs are covered with hand-made red tiles. Messrs. Doulton & Co. supplied the sanitary goods. The architect is Mr. G. Lewis Sheppard, A.R.I.B.A., of Worcester, and the contractors are Messrs. J. and A. Brazier, of Bromsgrove.

ARCHITECTURAL ASSOCIATION.

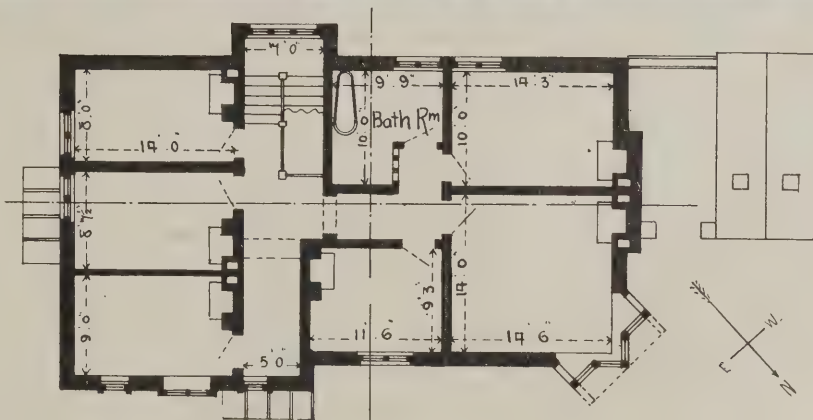
Mr. Guy Dawber's Presidential Address.

THE opening meeting of the session of the Architectural Association was held on Friday evening at 18, Tufton Street, Westminster, the chair being occupied by the new president, Mr. E. Guy Dawber, F.R.I.B.A. After the minutes and nominations had been read, Messrs. E. Prileau Warren, G. H. Yeoman, M. Botting, L. Furniss, G. L. Alexander and C. Whitby were elected members. It was announced that Messrs. J. A. Smith, L. Dennis and C. R. H. Tyndall had rejoined the Association and that the following additional donations to the Premises Fund had been received:—Mr. C. W. Stephenson £26 5s., Mr. E. Thornton £5 5s. The prizes were then distributed, after which Mr. Dawber delivered his presidential address. He said the occasion marked an epoch in their annals, as this was the first time the address had been delivered in a building devoted exclusively to the uses of the Association. So, after waiting for more than half a century, at last their desire had been fulfilled. The work of reconstruction, however, had incurred an expenditure of £10,000, half of which had been subscribed, and a generous donor had offered a further £1,000 provided the balance was raised before the end of the present session. In addition to new premises they had the collection of casts. The display of these would entail a vast amount of labour, but a start had been made under the direction of Mr. W. G. B. Lewis, and they hoped, in time, not only to see the work completed but a revised catalogue compiled. The membership of the Association continued to increase yearly—during the past two sessions at the rate of more than 100 per annum.

The day school, now under the mastership of Mr. Hugh P. G. Maule, was firmly established in its new quarters and an evening continuation school had been started under the direction of Mr. T. Frank Green. The fees for these various classes represented capital well invested; assistants could always command a larger salary if properly equipped, as the register of the Association clearly showed, there being always 25 per cent. more non-members wanting berths than members.

Architectural Teaching in the Provinces.

The Architectural Association represented the oldest educational body dealing exclusively with the training of architects in the United Kingdom, and was, he thought, the only society in which teaching had been carried on systematically from its foundation in 1847. There were chairs of architecture at the Royal Academy, the Royal College of Art and the Universities of London and King's College, and also Liverpool, Manchester, Glasgow and Edinburgh, at some of which a regular course of study was pursued; but, though there were no fewer than eighteen other architectural societies scattered throughout the provinces, it was only the Architectural Associations of Birmingham and Ireland that held classes of construction, design and history. The Devon and Exeter Architectural Society, founded in 1890, had, however, established classes for the teaching of design, and it had been arranged for some of the members of the Architectural Association to periodically visit and criticize the work—Mr. G. H. Fellowes Prynn having undertaken this for the ensuing session.



CHAMBER PLAN.



ADMINISTRATION BLOCK: GROUND-FLOOR PLAN.

It was much to be desired that other societies would follow this example, for although in many of the places where they existed there were technical colleges, schools of art and institutes, yet these did not and could not train architects in the systematic and thorough way which was felt nowadays to be a necessity.

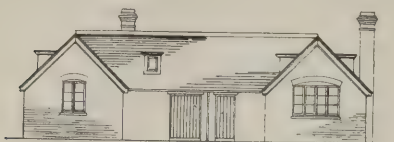
Mr. Dawber proceeded to refer to the question of education and said it was to be hoped that the report of the

Board of Education Committee appointed by the late council of the Institute, comprising, as it did, many of the soundest educational experts of the day, would result

in the establishment of some definite scheme of training which could be accepted by the various teaching bodies throughout the Kingdom. He felt sure the Association would welcome any suggestions that tended to bring its work into line with the new movement.

The Jumble of Modern Architecture.

Continuing, Mr. Dawber spoke of the lack of uniformity in modern architecture. He thought it was to be regretted that we had no Ministry of Fine Arts, or some consultative committee on art, which could advise when sites came into the market, or buildings were pulled down, as to the form the rebuilding



N.W. ELEVATION



S.E. ELEVATION



PLAN.

ISOLATION
HOSPITAL,
UPTON-ON-SEVERN:
LAUNDRY BLOCK.

S.W. ELEVATION



N.E. ELEVATION

Scale 0 5 10 20 30 40 50 feet

should take. It was, perhaps, too much to hope that the London County Council would control the capricious talents of architects and builders in Aldwych and Kingsway, but the greatest opportunity of recent years would be lost if such sites were allowed to be covered with individual erections—the creations of commercial syndicates—too varied in style and material to give any dignity or character to their environment. The recent changes in the Strand had proved that a great deal of the beauty of St. Mary's was due to the church being so well fitted in style and size to the position in which it was built, and to the height of the houses around it. He could not help thinking we had lost a good deal in the beauty and consistency of our street architecture since the days when such men as the Brothers Adam, Chambers, Nash and the Woods of Bath gave us their quiet façades and street fronts, all based on some idea and planned on a big scale, and, though perhaps slightly uninteresting to us to-day, yet possessing in a certain degree scale and symmetry. Without doubt all the

diversity of idea and design which we saw everywhere was attributable to our lack of architectural education in the past.

On the other hand, in essentially domestic architecture this country stood pre-eminent.

In municipal architecture too we had vastly improved during the past decade, and many modern buildings were well worthy of comparison with the works of bygone masters. But as a nation we had quite failed to recognize the importance to the community of well-thought-out schemes of building and their environment on a large scale.

Extension of Towns.

It was a great pity that English town councils did not study the admirable work of town extension now being done in Germany and did not obtain from Parliament powers to do similar work here; our towns might then be developed and improved on broad and dignified lines instead of in the present haphazard fashion.

It had been estimated that London suburbs were spreading and filling so fast that

900,000 people settled in them, in new houses, in ten years; thus to Greater London every year was added a city the size of Norwich!

Experiments had been made in recent years of building and laying-out towns and villages on some artistic basis, and with very satisfactory results. It had been shown that the buildings at Bournville could be erected to pay a fair return of interest for the outlay, entirely disposing of the fallacy that to build artistically was more expensive than otherwise. Unless this question of the extension of London suburbs were dealt with on some such lines, we should be surrounded by a belt of appalling monotony and ugliness, as every suburban extension made the existing suburbs less desirable.

Mr. Dawber next spoke of

Building By-laws

and the baneful and cramping effect produced by them. That the same rules framed originally for dealing with buildings in crowded cities should be applied indiscriminately all over the kingdom, and that only certain materials should be used in particular ways, not only tended to make our architecture lifeless and uninteresting, but caused the neglect and discouragement of all the old crafts and methods of building that made country districts so picturesque and interesting.

It was now frequently only on private estates that building could be carried on without interference, for, owing to the extended powers granted to the urban and district councils, properties miles away from the nearest town or village, and in many cases entirely isolated, were compelled to conform to these vexatious restrictions.

The peasant's cottage, too, had changed; it was now built in depressing rows, after the ugly model laid down by the Local Government Board; the open hearth giving place to the stove, the red-tiled floor to linoleum, and the old-fashioned lattice casements to sash windows and coloured glass.

Of course it was idle to wish for the old days to return; circumstances were altered, and as architects it was imperative for them to keep abreast of the times; but he urged his hearers to remember that there was an architecture for the country as for the town, and to bring the one into the peace and quiet of the other was altogether out of place.

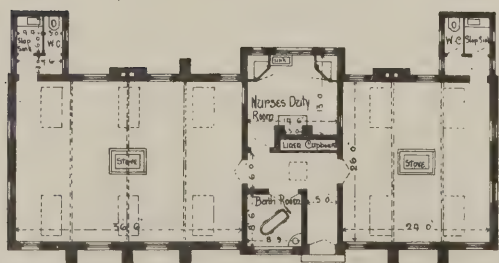
It was not to be thought, however, that architecture had vanished, as the pessimists



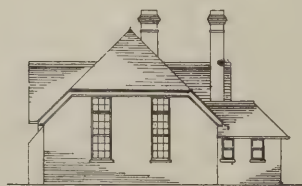
N.W. ELEVATION.



S.E. ELEVATION.



PLAN.



S.W. ELEVATION.

Scale 0 5 10 20 30 40 50 feet

ISOLATION HOSPITAL, UPTON-ON-SEVERN: WARD BLOCK. G. LEWIS SHEPPARD, A.R.I.B.A., ARCHITECT.

said; on the contrary, there was a strong and virile movement permeating it, as also decoration and the plastic arts.

Advice to Students.

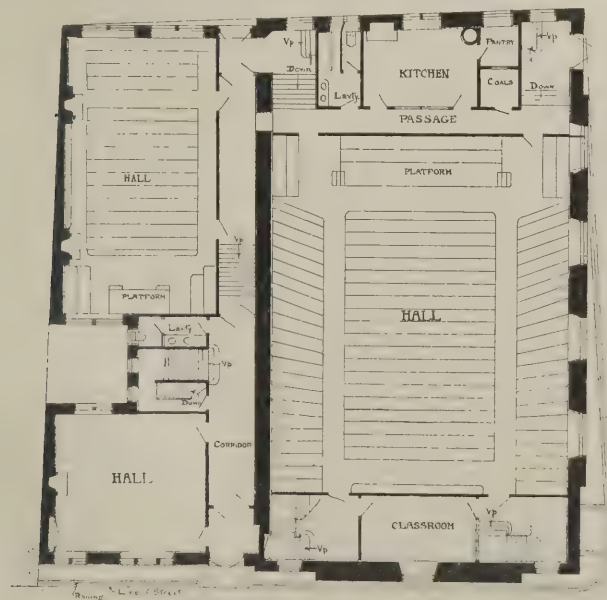
In conclusion, he urged students to look at things in the mass, to analyze, to enlarge their minds by visiting other countries, to guard against being carried away by the love of the pretty and picturesque, not to worry over trifling details and trivial mouldings and such things, to devote some of their leisure to reading the lives and biographies of our great architects and artists, to visit buildings in progress and to inspect workshops, to avoid being led astray by theories about the architect being his own craftsman, and, finally, to cultivate that spirit of comradeship with fellow students which had always been one of the chief aims of the Association.

A vote of thanks to the president for his address was proposed by Mr. Aston Webb, R.A., seconded by Mr. H. L. Florence and supported by Mr. Henry T. Hare. Mr. Webb announced his intention to add £50 to his former donation to the Premises Fund, and spoke of the excellent work done by the day school. Referring to the Board of Education Committee, he said that its deliberations would be of no use unless supported by the educational authorities, and he was glad to hear that the Architectural Association would help in this matter. As time went on they would, naturally, need to make certain modifications in their system; he thought at present it tended rather more to the exercise of memory than to thought and judgment in design, and he recalled in this connection the practice followed in his own student days, when the details of a church, for example, were eagerly sketched and measured, while the main idea and arrangement of the building was overlooked. They must all regret the state into which the Strand improvement scheme had fallen—how a competition had been held and one design chosen, and nothing else done in the matter from that day to this. Street improvements not only involved questions of drains and traffic, but the æsthetic appearance of the city they traversed.

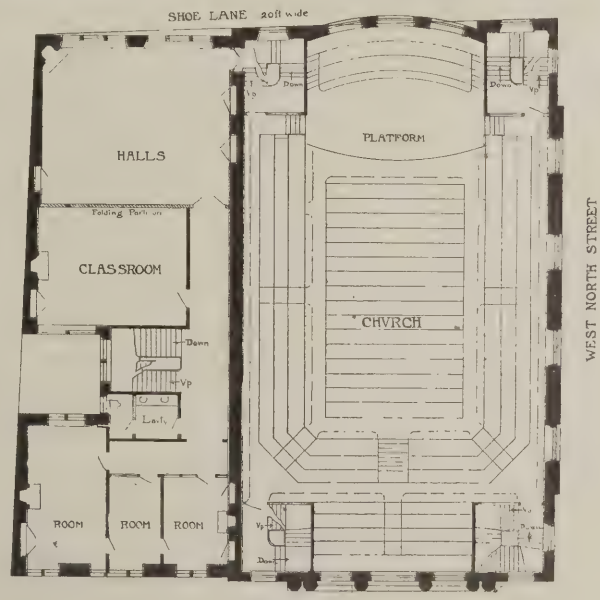
NORTH U.F. CHURCH, ABERDEEN.

THIS building, designed by Mr. W. E. Gauld, A.R.I.B.A., of Aberdeen, is one of the first of its kind to be built in Scotland for the purpose of carrying on East End mission work on somewhat similar lines to those of the Wesleyan Methodists in England. The large hall in the basement will seat about 550 and the smaller hall about 240. Four corner staircases connect with the church above and give entrance to and exit from these halls. On the intermediate floor, under the platform of the church, is a session house or classroom 24ft. by 18ft., with lavatory, &c., and on the opposite or Queen Street level a classroom or reading-room 25ft. by 24ft.; also lavatory accommodation and staircase to upper halls, &c. Below is a large cellar for the storage of seats, &c.,

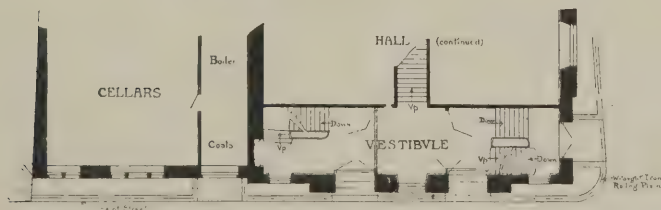
and boiler-house, with air inlet, fan, &c. On the first floor is a hall to Shoe Lane seating about 150, and a small hall or classroom connected by a folding partition. On the same level is a suite of rooms for the minister and lady workers, with lavatories, &c. The caretaker's house is on the second floor. The church measures about 90ft. by 50ft. and seats about 1,150 persons. A gallery runs round three sides. The buildings are lighted by electricity, and heated and ventilated on the "plenum" system, the latter being designed and carried out under the supervision of Mr. James Smith, consulting engineer, of Aberdeen. Externally the buildings are of blue and grey granite, with roofs of Port Dinorwic slates and terra-cotta ridging. The contractors are all of Aberdeen, and the work is being personally supervised by the architect. It is intended to open the buildings in the autumn of next year.



BASEMENT PLAN.



QUEEN STREET
FIRST-FLOOR PLAN.



INTERMEDIATE-FLOOR PLAN.



NORTH U.F. CHURCH, ABERDEEN.
WILLIAM E. GAULD, A.R.I.B.A. ARCHITECT.

Law Cases.

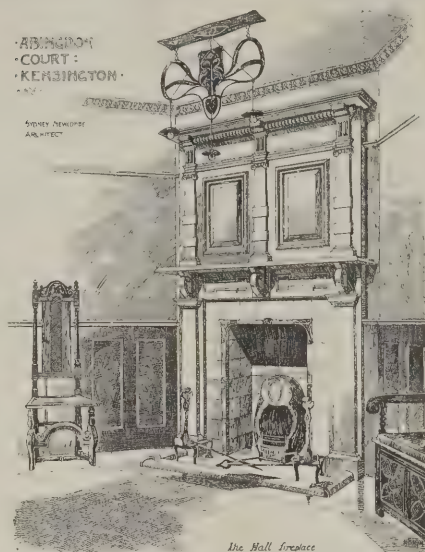
Air-Space around Houses.—At the Glasgow Central Police Court last Wednesday the factors of three properties in Rosslyn Place were charged with contravening the Buildings Regulations Act by reason of there not being in front of at least one-third of the window of a room let as a sleeping apartment an open space equal to at least three-fourths of the height of the wall in which the window was placed. Fines of 5s. and 10s. 6d. were imposed.

Bats for Bricks.—Mr. Henry J. Osborne was recently summoned before the Croydon County Bench for building two houses in Carshalton without proper walls of good bricks and good mortar. Mr. W. Willis Gale, surveyor to the Carshalton Urban District Council, said the houses were built with bats and bricks from some ruins. In one case there were eleven whole bricks where there should have been sixty; the rest were bats; and it was impossible with the material used to bind them together properly. Mr. R. M. Chart, surveyor to the Croydon Rural District Council, said there was no proper bond. In one piece of work 3ft. by 3ft. 8ins. there were forty-eight bats and only one stretcher and in another piece 169 bats. In one pier there was only one brick, and that was not bonded.—The Bench imposed a fine of £2 and 15s. 6d. costs.

OUR PLATES.

THE house at Chattis Hill, Hants, takes its name from the well-known racing establishment of Mr. Thomas Cannon, near Stockbridge, and completes the buildings which have been in course of erection since 1900. It is situated near the Salisbury Road and commands the whole of the estate and training grounds. The walls are built double with red-brick facings and Bath-stone dressings. The roofs are covered with Broseley tiles; gun-metal casements by Messrs. Crittal & Co., lead lights by Messrs. Morris & Co. Electric light is supplied by a private plant designed for the seventy loose boxes, lads' quarters and men's cottages, &c., by Messrs. Winter & Co., of Bristol. The architects were Messrs. Macalister & Tench, of Cambridge and London, and the contractor was Mr. Sidney Bell, of Andover.

A description of Sir Charles A. Nicholson's design for Liverpool Cathedral, with plan, sections and elevations, will be found in THE BUILDERS' JOURNAL for June 17th, 1903.



Builders' Notes.

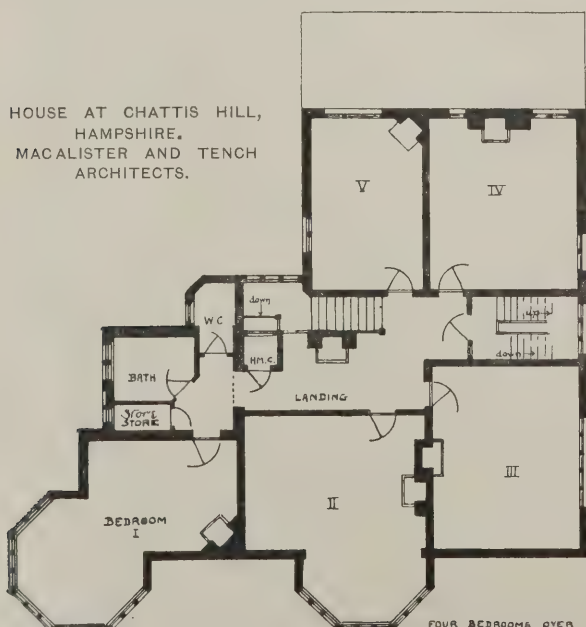
The Cardiff Master-Builders are to send a deputation to the Corporation with the object of securing some amelioration of the building by-laws.

Tees-side Strike Ended.—After coming to terms with the bricklayers and plasterers employed in the Hartlepoons, Stockton, Middlesbrough and Thornaby, who agreed to a reduction of $\frac{1}{3}$ d. (from 10d. to 9 $\frac{1}{3}$ d.) per hour, the Tees-side Master-Builders' Association have now settled with the bricklayers' and plasterers' labourers, who have accepted a somewhat similar reduction. This concludes a strike which has lasted nearly six months, and which has kept the building trade on the Tees-side at a standstill.

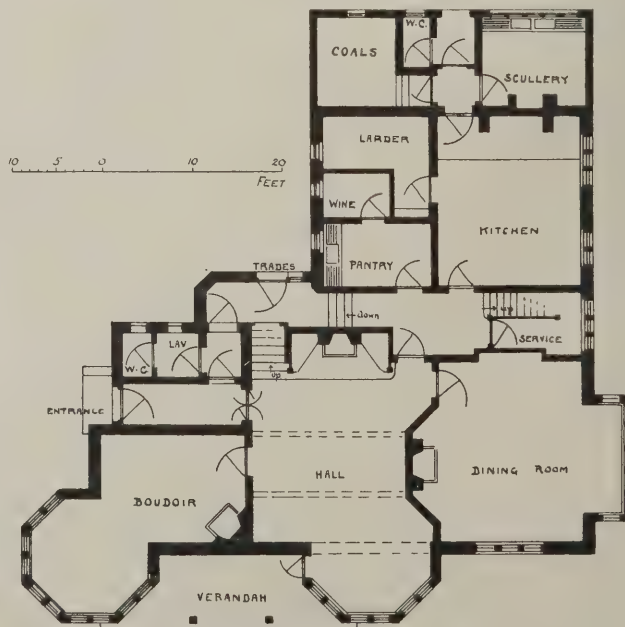
The Sea Wall at Galveston, Texas, the greatest structure of its kind in the world, has been completed. It is 17,593ft. long, 16ft. wide at the base, 5ft wide at the top, and stands 17ft. above mean low tide, with a granite riprap apron extending 27ft. out on the gulf side. The contract price for the work was £239,623. The actual construction of the wall proper occupied sixteen months and seventeen days. The grade of Galveston is now to be raised to slope gradually from the top of the sea wall. This will necessitate the raising of the grade from 1ft. to 15ft., according to position.

Glasgow Building Trade Brisk.—Lord Inverclyde in his valedictory address at the Dean of Guild Court, Glasgow, last Thursday, said that the total valuation of the linings granted at the Court during the past year was £2,118,800—the third highest on record, and not very far below the valuations for the previous year. There had been a marked falling off in the applications for linings for houses with a small number of apartments and for houses with six apartments and upwards, showing that the supplies of the last few years had more than met the demand, but this falling off had been counteracted by the increased valuation of linings in connection with public buildings, warehouses and workshops, and alterations and additions to existing buildings. For the five quinquennial periods since 1879 the valuations on linings had been:—To 1884, £2,333,000; to 1889, £2,244,000; to 1894, £4,542,000; to 1899, £8,747,000; and to 1904, £10,400,000; while the population had increased during the twenty-five years from 500,000 to 780,000.

Work in the Colonies.—The October circulars of the Emigrants' Information Office show the prospects of emigration in the Colonies. The third-class fare to Canada is now as low as £2 10s. to £3, but it is too late in the year for the ordinary emigrant to go there in search of work unless he can keep himself through the winter. The building, metal, engineering and manufacturing trades generally have been busy for some time, and skilled men, such as carpenters, bricklayers, masons, brickmakers, &c., have had no difficulty in procuring work; but now the supply of mechanics and general labourers is quite sufficient, and the emigration of such persons is not recommended. In Australia there is little demand anywhere for more miners, mechanics or general labourers. In New Zealand skilled mechanics should be able to obtain work without waiting long. Reduced passages are given to persons possessing fixed incomes or a capital of at least £50. No persons are allowed to land in Cape Colony unless they have secured definite employment there and possess £20 on arrival, or have permits to enter the Transvaal or Orange River Colony. The labour market is overstocked, and persons are warned against going out at the present time. The building trade in Natal has been fairly busy, but labour is plentiful and large numbers of unskilled workers and indifferent workmen are unable to obtain employment; hence the same warning applies to Natal as to the Cape.



FIRST-FLOOR PLAN.



GROUND-FLOOR PLAN.

HOUSE AT CHATTIS HILL,
HAMPSHIRE.
MACALISTER AND TENCH
ARCHITECTS.

Construction Notes.

Sea Coast Erosion.

At a meeting of the Society of Engineers last Monday Mr. R. G. Allanson-Winn, M.I.C.E.I., read a paper on "Deep Sea Erosion and Foreshore Protection" in which he advanced the theory that where the encroachment of the sea was steady and continuous, and the material was of a soft and easily eroded nature for a considerable depth below low-water level, protective devices erected on the visible shore between high- and low-water marks would not necessarily arrest the encroachment of the sea. Very often the encroachment of the sea was due more to erosion of material below low-water level than to what could be observed taking place on the exposed shore. He described a form of slanting and curved groyne which he thought might be applied to many shores with advantage; it combines many of the advantages of the high-slanting groynes and the low groynes. He made the announcement that he believed he had discovered an entirely new method of groyning, and that as soon as he had given his discovery a practical test he would bring the subject before the Society.

Lighting.

HERR W. WEDDING, a German engineer, has been comparing the different systems of lighting from the point of view of the luminous intensity, cost, evolution of heat, utilization of energy, &c. As regards illuminating value, he states that an ordinary petroleum lamp with a 14-line burner will give 14.8 normal candle power, an incandescent alcohol lamp 65.3, and an incandescent gas lamp 73.8 normal candles. The Auer light appears to be the most economical with respect to illumination, and the price of a unit of light is about the same for petroleum and alcohol. "Intensive gas" burners, as lately designed, have very high illuminating powers; the Lucas light, characterized by a prolonged funnel and an augmented draught, gives 48 candles; compressed gas lamps 303, and "Millennium" light the enormous amount of 1,500 candles. As regards electric lamps, small carbon filament incandescent lamps give 18.3, and large lamps 33.8 candles, while the figure corresponding to osmium lamps is 42.3, and Nernst lamps 184 candles, measurements being made in a horizontal direction. All these different lighting systems utilize the energy stored up in the fuel rather imperfectly. The 30½ millions of normal candles of light produced by electricity in Berlin—i.e., 500,000 incandescent lamps of 25 candles, and 18,000 arc lamps of 1,000 candles each—would, in the case of energy stored up in the carbon being entirely utilized, require only $\frac{1}{100}$ horse-power, namely, the strength of a little child, and the condition for lighting gas is quite analagous. Incandescent alcohol light and flame arcs show the most economical utilization of fuel. As to incandescent electric light, osmium light is remarkable for its constancy and for the fact that the filaments are burnt through as soon as the lamp has lost one-fifth of its initial luminous power. On an average Nernst lamps stand 700 to 800 burning hours. Among electric arc lamps, Bremer light requires only one-third of the energy required by an ordinary arc lamp. Enclosed arc lamps represent another improved type. Dr. Lehmann Richter, in making comparative tests of incandescent gas and electric arc lights, obtained the following results:—The surface luminous intensity at the level of the eye was quite satisfactory from both light sources, arc light affording a very uniform distribution of light. In the case of electric arc light no injurious change in the atmosphere was noted; the temperature did not rise to any appreciable extent, nor was the

percentage of carbonic-acid gas present augmented. Incandescent gas light on the other hand raised the temperature on the level of the eye by about 6 degs. C. In the course of three hours, while the percentage of carbonic-acid gas increased to more than five times the initial figure. As to cost, this was less in the beginning with Auer light, but after a short time a figure was reached corresponding to arc light even without taking the by-pass flame into account; if this latter was included, the cost of electric light was somewhat less.

Views and Reviews.

Poor Law Buildings and Mortuaries.

The author of this book has brought together in a small compass (only seventy pages) a mass of useful information bearing on the above subject, the various chapters being illustrated by drawings of existing buildings and by suggestive plans of each of the several parts which are necessary in a complete poor-law scheme. In the preliminary chapter he rightly insists on the fact that the buildings for the aged and infirm, the sick and afflicted, should be made as comfortable as possible, whilst those for the habitual tramp and loafer should be such as to render residence in the house as uninviting as possible, consistent with cleanliness and sanitary conditions. This chapter also deals with the general principles of planning in reference to the spacing of beds, means of escape in case of fire, fire hydrants, &c., and concludes with a general note on the approximate cost of the buildings. Chapter 2 is devoted to casual vagrant buildings, and is illustrated by plans and sections of sleeping and labour cells, with details of doors, windows, &c. The entrance and administration buildings are fully treated in chapter 3; and plans of relief office, central block for a workhouse infirmary, a nurses' home and the offices for a small workhouse are given. Chapter 4 deals with the day-rooms, wards, &c., for able-bodied inmates. Plans are given, together with useful notes on the relative floor and cubic space for dormitories, those for women and children, and also for the aged and infirm, which rooms are occupied day and night. Chapter 5 treats of the buildings required for the aged, infirm and married couples; whilst chapter 6 deals with those for imbeciles and short-period lunatics. These are necessary in order to detain an inmate until an order can be obtained from the Lunacy Commissioners for removal to an asylum. Sick lying-in wards and isolation wards are treated at length in chapter 7, and a large amount of useful information is given, with details of the chief fittings. The chapter on cottage homes for children on the "Boarding-out," "Scattered" and "Cottage Home" principles is comprehensive and fully illustrated. Plans of the necessary adjuncts, such as schools, laundries, infirmaries, &c., are shown. Chapter 9 contains descriptions of laundries, boiler-houses, &c., for a large scheme. A very useful summary of the Local Government Board requirements as regards plans and loans is given. Public and hospital mortuaries are dealt with in chapter 11. Much useful information is embodied, with plans and details of fittings, such as coffin racks, post-mortem tables, &c. In the suggested plan for a public mortuary with a disinfecting station attached, a store for articles disinfected would be necessary. Shelves in the "clean" room are inadvisable for this purpose. The book concludes with an appendix containing letters from the Poor Law and Local Government Boards on cubic space, aged married couples and aged deserving poor, whilst an excellent index is provided at the end. Throughout the work plans are illustrated of complete poor-law buildings and also subsidiary buildings as

executed. It would have been better had all the illustrations been numbered, to facilitate reference to them in the text.

"The Planning of Poor Law Buildings and Mortuaries," by Albert C. Freeman. London: St. Bride's Press, Bride Lane, E.C., price 7s. 6d. nett.

The Best Book on Pure Mechanics.

We heartily recommend this book to all students of mechanics. It is distinctly the best elementary book on the subject. And in calling it elementary we do not wish to imply that it is meagre in its treatment. It is much more than that; it deals with the elemental principles of mechanics in a simple way, and treats of much that is ordinarily neglected because it is thought too difficult to be understood by students. The book is not advanced; no abstruse mathematics are gone into, nor the practical applications of the principles, except in the way of simple explanatory examples. The author has duly apprehended the reasons of failure in the usual methods of instruction and the needs to be met, and we cannot do better than quote some of his remarks in the preface: "It is a common complaint that though the principles of mechanics are the simplest and the earliest to be discovered in the whole range of science, and moreover are directly illustrated in almost every act of our lives, more difficulty is found in giving beginners a real grasp of them than with any other branch of physics. This I attribute to the way in which the text-books deal with the subject. The student usually opens the book upon a chapter in which such leading concepts as matter, force, mass, particle, rigid body, smooth body are treated in definitions of a line or two each, before he sees any reason for their introduction at all. . . . The second chapter plunges him into the mathematical study of motion in the abstract. . . . At last there is a chapter on the laws of motion, so inadequately treated that he often ends by believing that they were made up by Sir Isaac Newton, the author, so far as he is aware, of the whole subject. The rest of the book is too often merely geometrical and trigonometrical gymnastics." Biologists have shown that the bodily development of the individual is an epitome of the development of the race, and educationists have now come to realize that the most natural method of attacking a subject is therefore the historical one. This is the line upon which Mr. Cox has proceeded in this book, with conspicuous success. In this he has followed Prof. Ernst Mach's "Die Mechanik in ihre Entwicklung," of which work the author modestly claims his own to be merely an abridgment. Mr. Cox in writing this book has kept before him the following aims:—(1) To avoid as far as possible merely mathematical difficulties, and reserving those that could not be avoided for separate treatment in the later parts of the book. (2) To develop the principles in their historical order starting from real problems, as the subject started, showing how the great investigators attacked those problems, and only introducing the leading concepts as they arise necessarily and naturally in the course of solving them. (3) To bring out incidentally the points of philosophic interest and the method of science. (4) To appeal constantly to experiment, as far as possible in the original form, for purposes of verification in the early part of the subject. (5) To interest the student in the personality of the great pioneers, and if possible induce the habit of referring to original sources. (6) Not to overload the text with masses of examples. The book is well produced, the illustrations being clear and including some excellent photographs of actual apparatus used at Montreal.

"Mechanics," by John Cox, M.A., F.R.S.C., Macdonald Professor of Physics in the McGill University, Montreal. Cambridge: University Press; London: C. J. Clay & Sons, Ave Maria Lane, E.C., price 9s. nett.

CORONERS' COURTS AND PUBLIC MORTUARIES.

By E. B. B. NEWTON, A.M.I.C.E., F.S.I.

(Concluded from p. 164, No. 503.)

THE front elevation of the coroner's court may well be one of considerable dignity, with a good entrance. The premises should comprise as much as is found practicable of the following accommodation:—Large airy court for the holding of inquests containing accommodation for coroner, jury, witnesses, officials, press and public, private retiring-room and office with conveniences attached for the coroner, waiting-rooms for witnesses and for a prisoner, also with conveniences, preferably, if space will allow, for both sexes, porter's office and store. There should be a rear or side entrance by means of which the jury may proceed from the court to the mortuaries for viewing purposes. The apartments of the caretaker may well be provided in the same building as the coroner's court; they consist of a living-room, scullery, two bedrooms, sink, w.c. and an office. In the basement may be a coal-house and boiler-house.

The floors of the coroner's court are best of wood blocks, and the rest of the public rooms of terrazzo. The floors of the caretaker's rooms and the shelter, if there be one provided, should be of concrete covered with battens.

The buildings are best heated by a low-pressure hot-water installation with radiators in convenient positions, and ventilation can be satisfactorily arranged for by electric fans, provided that their sizes and those of the necessary air inlets and outlets are properly adjusted, the entering air being first warmed, if practicable.

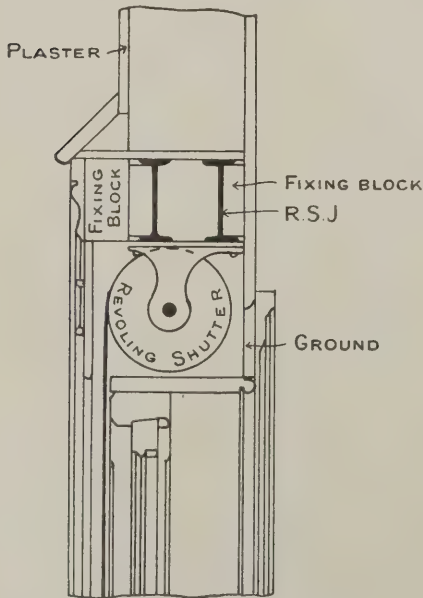
It is as well also to make provision for open fires in case these are required for any reason.

Shelter.

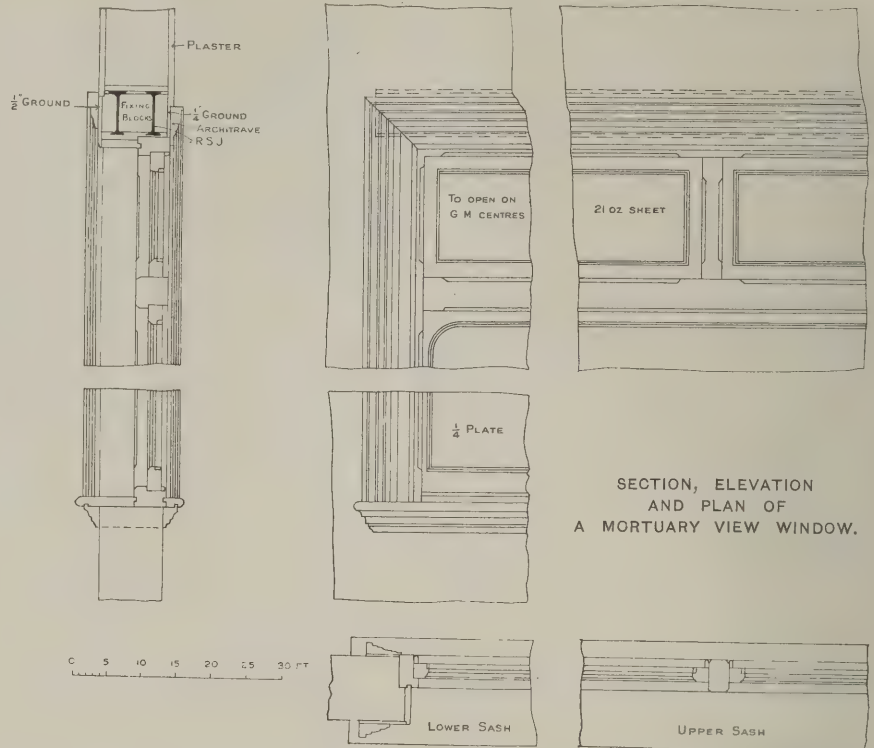
In some cases it may be found an advantage to arrange for the provision of shelters for families who have been temporarily dishoused while disinfecting operations are being carried out in their houses. Suitable apartments may be constructed consisting of two or three simple rooms, for living and sleeping, with the necessary offices, either in a portion of the coroner's court block or separately from this.

The Mortuary

should be so arranged that one side abuts on a passage from which the interior may be entirely inspected through a large window



SECTION OF MORTUARY VIEW WINDOW WITH REVOLVING SHUTTER BLIND.



SECTION, ELEVATION AND PLAN OF A MORTUARY VIEW WINDOW.

of clear plate-glass hermetically sealed. The jurymen viewing the body may then stand in this passage and perform their duties without entering the room itself. When not in use for this purpose the window should be concealed by a spring blind such as is used for shop windows fronting upon public highways.

This passage should also abut upon a recess about 2ft. or 3ft. deep, adequately ventilated and lighted, and closed by large glazed doors through which may be inspected any garments that may have been taken from bodies.

The mortuary buildings should be substantially built. As coolness is desirable, hollow walls may be constructed on the sides liable to be affected by the sun's rays. In these walls double windows should be used.

The walls should have their angles externally formed with bull-nosed blue bricks to avoid chipping by vehicles. For the same reason guard-posts of granite or iron should be placed so as to protect corners around which vehicles may turn or pass. The walls are best lined internally with white-glazed bricks or tiles, with, if desired, salt-glazed plinths and bands. Tiles are liable to craze under certain conditions, and bricks are more durable, though the initial appearance at least of tiling is perhaps more handsome if well executed. The pointing may be carried out with silver sand and Robinson's cement. Where expense is a consideration the glazed work may terminate about 5ft. above the floor and the walls be plastered above with Robinson's cement and sand in two coats and afterwards painted with enamel paint. Unless moisture is likely to attack the plastering it is best executed entirely of Robinson's cement and sand, though the cost is slightly greater than if a backing of Portland cement and sand be used.

Where plastering is used above the glazed work the latter should be surmounted by a special salt-glazed moulded course. It should be remembered that the plastering will be about $\frac{3}{4}$ in. in advance of the face of the white-glazed work.

The internal angles of the walls and their intersection with the floor are best formed with a curved hollow so as to permit of easy

cleaning. If this hollow be formed where there is glazed work which cannot easily be cut down to the floor-line, this line around the walls must be horizontal, and consequently the floor, unless laid perfectly level, must be formed so as to drain towards the centre: otherwise there must be a curved cement hollow of varying depth under the glazed work. Practically, it is fairly satisfactory to form the floor with a square angle against the walls and suitable falls to permit of its draining to openings in the walls discharging the floor washings over gulleys in the open air. These openings when not in use may each be closed by a perforated grating fixed in a strong steel frame built into the wall. There should also be at floor-level several openings in the walls, each covered with a perforated grating, for ventilating purposes only. The floor itself should be of cement-concrete covered with some smooth impervious material capable of being easily washed. Sinkings for mats should be avoided, as they interfere with the proper washing of the floors. Slates, tiles, cement and asphalt are quite satisfactory, but probably the best result is obtained by the use of terrazzo, that is to say, random mosaic. It is inexpensive and may be used for the passages and floors generally. The roof is best open, so as to give loftiness and plenty of air-space to the room. A double roof is frequently advised, but in ordinary circumstances a roof boarded above and below the common rafters and felted under slates or tiles is satisfactory. Tiles are better than slates from a non-conducting point of view. The roof should be provided with ventilators and a lantern light. Either louvres or central-hung casements actuated by special steel rod gearing so as to open to a full horizontal position may be used. The latter are excellent, and where liable to be affected by the sun's rays should be provided with a canopy or screen. Every possible opportunity for the fixing of inlets and outlet ventilators should be taken advantage of, as thorough ventilation is of the first importance. As much light as possible should be obtained, but all the external windows and roof-lights should be glazed with obscured glass of some kind, and in the walls double-hung sashes are generally best, as they allow

the upper portion to be opened for ventilation without exposing the interior of the building.

The roof and roof-boarding and all wood-work may be of pitch or yellow pine varnished. The ornamentation should throughout be confined to plain chamfers with stops; no mouldings or beads which might hold dust are permissible. Where expense is no object, hardwood may be used, but those woods previously mentioned have a satisfactory effect and their light colour is advantageous.

As a rule, the shells containing bodies are placed in the mortuary upon slabs or shelves about 3ft. wide, about 7ft. long and about 2ft. high per shell to be accommodated, formed of slate about 1½ ins. thick, or of glazed ware supported on brick walls or iron columns, or in catacombs formed against an external wall. These may be of slate and brickwork, with slate rollers fixed into gun-metal bearers for the heavy shells to run upon. The front is sometimes closed by air-tight slate or iron doors, and each receptacle should have a door in the outer wall at the back as well as the front so that it may be thoroughly cleaned out from time to time.

A preferable arrangement is a similar set of receptacles formed of light steel sections with a close front and top, but where adequate space is available it is best in public mortuaries to make no special provision of shelves or pigeon-holes for the shells containing bodies, and instead to place these on simple wooden trestles while awaiting inspection. The trestles if possible should be not more than about 3ft. high or there will be difficulty in moving heavy shells.

Arrangements are in use in some places whereby bodies are placed in chambers or catacombs entirely sealed with the exception of an air inlet to the front so contrived that air is admitted from the open air outside the room containing the catacombs and an outlet to the back, communicating with a flue at the back in which may be placed a fan or gas jet to ensure that a constant stream of air passes over the body in the shell. If desired, an additional precaution against the emission of odour may be taken by inserting a tray of some strong disinfectant or a cage containing dry charcoal in the chamber.

Tilting travelling light carriages should be provided for rapidly and easily moving the bodies to proper positions opposite the view window.

In a large mortuary there can be little doubt that an overhead traveller would be of the greatest convenience for moving bodies to their proper positions. Such travellers are in use in some hospitals, but the writer is not aware of one in a public mortuary.

The mortuary chapel should be similarly constructed. Its use would be for those bodies upon which no inquest was to be held and which for some circumstance could not be conveniently and properly retained elsewhere pending burial.

Here, even more than in the mortuary proper, shelves and catacombs are out of place, and the course recommended in the case of the mortuary will be found much less repugnant to the feelings of relatives and friends.

The post-mortem room should be constructed in a similar manner to the mortuary. Heating of some kind may be requisite in cold weather, so that it is well to provide a gas stove with a proper flue, which will also assist ventilation at all times. Hot water when required may be obtained from a geyser. The post-mortem tables may be of slate or glazed ware supported on brick walls, or of similar material and fixed on a central cast-iron or steel column so as to turn to any position; they are made with a ball and socket attachment so that they may be revolved or tilted into almost any position that is requisite, but opinions vary as to the respective advantages of the

several patterns and the tables should be so chosen as to suit the personal views of those who will be most likely to use them. Glazed fireclay is a most satisfactory material, but central drainage of the table is objectionable. The table should drain to one end and the liquid matter be carried thence in a suitably-bent pipe under the slab to a central channel of white-glazed ware laid to fall to a gully.

A raised wooden, open, narrow batten platform should be laid in sections around the table for the comfort of the operators.

A glazed ware or slate shelf may be fixed under the window, as well as a large deep sink. The latter is best of white-glazed ware with a grooved lead-covered draining-board by its side.

An adjunct of the post-mortem room is the laboratory or microscopical-examination room. This should be well-lighted and fitted up with cupboards and shelves of slate or thick plate-glass.

Adjoining the post-mortem room and laboratory should be provided a w.c. and a lavatory, the fittings of both of which are best made of white-glazed ware of a simple character.

Infectious Mortuary.

The purpose of an infectious mortuary is not so much the reception of bodies of persons who while suffering from an infectious disease have died by misadventure as of persons who have died from an infectious disease and whose bodies if retained in any other place than the mortuary would be a source of danger to others.

In this building it is needless to say that facilities for thorough cleanliness in every sense of the word are imperative. It is essential that the bodies should be capable of being viewed by persons standing outside the building. This may be accomplished, if the mortuary is a large one, by having a view window with double sashes, the inner one being glazed with obscured glass. The person viewing the body may stand outside the window and the inner sash be opened either by an attendant inside the room or from the outside by means of cord and pulleys sealed from unauthorized use by locked boxes. The bodies would be stored in shells resting upon trestles as previously described, or on shelves or in catacombs.

An alternative arrangement is to provide in the open air a small sealed chamber, or a

series of such chambers about, 7ft. by 3ft. by 2ft. internally in the clear, each covered by a glass sheet and rendered quite airtight with the exception of an inlet and outlet ventilator through which a current of air is induced, and which are so placed as to prevent any fumes reaching the persons viewing the body. Such chambers should be lined internally with an impervious material such as natural mastic asphalt or white-glazed bricks.

Disinfection.

Adjuncts to mortuary buildings are an incinerator and disinfectant.

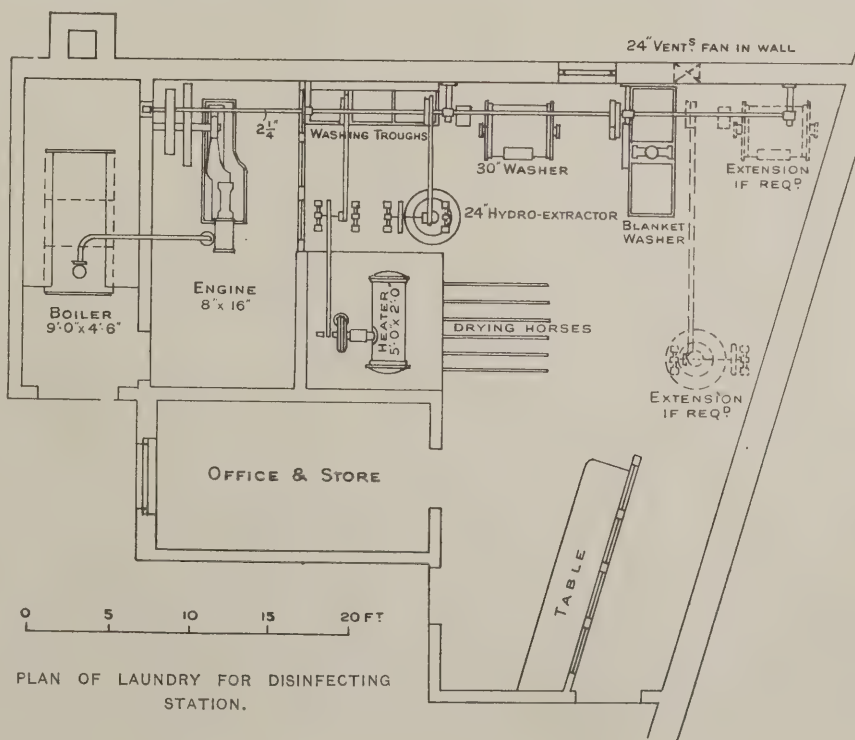
By means of one all foul, verminous and infectious clothing, bedding and other articles may be completely destroyed, and by the other such things may be thoroughly disinfected and rendered harmless.

The incinerator may consist of a large grate with a space for articles underneath, all being connected with a moderately high shaft. When the furnace is started the articles underneath are gradually consumed. Dr. Sergeant's incinerator has also been used with success, the gases evolved by the destruction of the infected articles being passed over an independent coke fire or fume cremator. The furnace walls should, of course, be lined with firebricks.

For greater requirements an improved modern destructor cell may be built. Several well-known firms make special incinerator cells.

Disinfection is usually and most efficiently carried out by means of steam. A vertical boiler is most commonly used for generating steam on account of the small space it occupies; but in a larger installation where there is a moderately constant demand for steam a Cornish boiler is better and more economical. The advantages of a good feed heater should not be overlooked. It is needless to say that there should be a duplicate boiler for use while the other is being cleaned or repaired. There are many forms of disinfectors on the market, some of which work at atmospheric pressure and some at a pressure greater than the atmosphere. Among others may be mentioned Manlove Alliott's Washington Lyons, Defries' Equifex, Dr. Thresh's, Goddard, Massy & Warner's, Reck's (Copenhagen), Cherry Tree Co.'s (Accrington), Bradford's permeator.

The most approved method of construction is for the disinfectant to be placed between



two chambers separated by a solid wall and without means of direct access from one to the other. One chamber is retained exclusively for articles before treatment and the other for the disinfected ones.

The charge is brought into the former room and placed in the disinfector cage. The machine is then closed and dry steam admitted. After the lapse of a certain time, generally about half an hour, the door in the disinfector in the other room is opened and the disinfected charge removed for whatever further processes it may have to pass through ere it is returned to the owners.

Besides steam disinfection, there are various other methods which are employed to meet the occasional presence of articles which are too delicate to be treated by steam. The steam disinfecting machine can, however, be so arranged as to be capable of performing chemical disinfection when requisite.

Slate shelves or galvanized iron racks should be fixed in the disinfecting-rooms for the reception of articles.

Laundry.

If a laundry be attached to the establishment, provision should be made for plain washing.

The washing machines should be carefully chosen. Many of them have an unfortunate characteristic of tearing the clothes within, so that a smooth tight interior should be ensured. Glazed earthenware washtubs are best, though sometimes they crack.

The best method of drying where a large open-air space is not available (as is usually the case) is by the employment of iron or steel horses in an artificially-heated chamber, drawing out upon light iron tramlines flush with the floor. A closet fitted with a standard and radial arms is not so satisfactory. Plenty of air passing through the chamber is essential to proper and rapid drying, and the use of a heater and fan for this purpose is of advantage.

The articles should pass through a preliminary drying in centrifugal hydro-extractors, and then be subjected to a final treatment on the horses.

All the appliances should be properly fitted up with hot- and cold-water supplies, and a little additional initial expenditure upon copper piping throughout for hot liquids will be an economy eventually.

Where women are employed in the laundry the provision of separate conveniences must not be overlooked.

In laundries attached to mortuary buildings, under certain circumstances and especially where there is a supply of continuous current, the machinery may with advantage be worked by electric power. The best makers of such machinery now supply machines which may be driven direct from the shaft of a motor coupled to it. Each machine may therefore be worked alone, and even where plenty of steam is available this method may be found the most desirable one to adopt. If horizontal steam-engines are preferred, these, like the boilers, should be duplicated to guard against a stoppage during a breakdown.

The laundry should have a sufficient number of tables and shelves for the reception of articles.

The store should be fitted up with commodious shelves divided into compartments for finished bundles of articles.

Buildings for Verminous Persons.

The buildings for the purpose of dealing with persons who are infested with vermin should comprise a receiving-room, where their clothes may be removed for treatment in the disinfector; a bathroom with two doors, the second of which leads to the dressing-room, where the disinfected clothing is resumed. Conveniences should be provided. The baths may take the form of the ordinary tub or slipper bath or spray baths such as are now in use in some towns.

Such a spray bath uses but a trifling amount of water, has many sanitary advantages as compared with the ordinary hot bath, and the process of using one occupies a short time only, so that a smaller establishment is necessary where spray baths are used instead of the ordinary baths.

Van Sheds.

Van sheds for infected and non-infected vans used for the conveyance of bodies and of clothing and other articles should be provided, and store-rooms for spare shells, &c. The vans should be plain, zinc lined and capable of being easily cleaned.

Stabling.

Stabling may also be necessary, in which case a commodious harness-room will be a proper adjunct.

Generally.

The buildings which may be regarded as complementary to the mortuary building proper should be plainly and substantially constructed. Plenty of light and efficient ventilation should always be made a principal object. Where expense is not of great importance there is a gain in every way by the use of salt glazed bricks for the interiors, at least to a height sufficient to form a dado. Above this dado the walls may be lime-whited. The floors should be of slate or concrete except in the stable, where adamantine clinkers are probably most satisfactory. They should be as far as possible at one level, particularly throughout the disinfecting and washing departments. Outlet ventilators in the roofs and air inlets around the floors when properly controlled will always be found a success, and in a laundry they are essential.

In all these buildings the exposed iron-work and the pipes inside and outside may with advantage be glass or vitreous enamelled.

Each building should have a good-sized stand-pipe, with hose attachment, so that there may always be an adequate and convenient supply of water for flushing and cleansing purposes available at all times.

Paving.

The areas around the various buildings should be paved with some sound impervious material laid with good falls and capable of being easily washed down into the gutters provided, and kept clean. Probably asphalt most completely fulfils all requirements, though for various reasons it may be oft-times desirable to use some other material, such as granite or gritstone sets grouted with some bituminous mixture, tar macadam, Wilkes's and other metallic paving, paving bricks or asphalt blocks for the carriage-ways, and asphalt natural or artificial stone, concrete flags or concrete laid *in situ*, paving bricks or tar macadam for the footways. If asphalt be used, the compressed variety, say 1½ ins. thick on a foundation 6 ins. thick of cement-concrete with a cement and sand floated surface, is probably best for the carriage-ways, and mastic, say ¾ in. thick, on a similar foundation 3 ins. or 4 ins. thick, for the footways.

A flat granite or gritstone curb about 12 ins. wide has a good appearance and is essential as a finish to the footways.

Drainage.

The drains should be so laid out as to be easily inspected and readily cleansed and freed from obstructions. It is well to connect the system of the infected parts of the establishment separately to the sewer, intercepted in the ordinary way.

Artificial Lighting.

As bodies may be brought upon the premises at all hours of the night, a sufficiency of artificial light, both without and within the buildings, is essential. For the outdoor lighting Kern burners fitted with anti-vibrators are most economical and effective. They need not be of a larger size than No. 2

or No. 3, and on the whole are best when fitted with by-passes, though the latter consume about ½ cub. ft. of gas per hour.

The burners should be fixed in draught- and dust-proof lanterns attached by brackets to the walls of the buildings.

The same kind of burner is very satisfactory when used inside the various buildings, but if an electricity supply is conveniently near it is better to take advantage of it by using glow lamps. These can be readily lit by switches fixed in convenient places near the entrances and outside the rooms to be inspected, and are more conveniently and rapidly dealt with than gas-burners. Moreover they are productive of practically no heat.

There should be no stinting of light, especially in the post-mortem room and laboratory.

LHASA CATHEDRAL.

The Most Interesting Building in Central Asia.

LHASA the wonderful, the city of splendour, has now been seen to be a collection of inconsequent houses dominated by two important buildings, the Potala Palace and the Jo-Kang or cathedral. A good deal has been said about the former, which is a place of considerable architectural pretensions, but until the newspaper correspondents were enabled to visit the cathedral, by reason of the British mission to Tibet, we had no conception of the building. The exterior is devoid of beauty and dignity, but the interior is "unquestionably the most important and interesting thing in Central Asia."

All round the cathedral the dirty and insignificant council-chambers and offices in which the affairs of Tibet are debated and administered lean like parasites against it for support. From Chagpori the five great gilded roofs are indeed to be seen blazing in the sun, but even this suggestion of importance vanishes as one treads through the filth of the narrow streets to the western entrance of the cathedral.

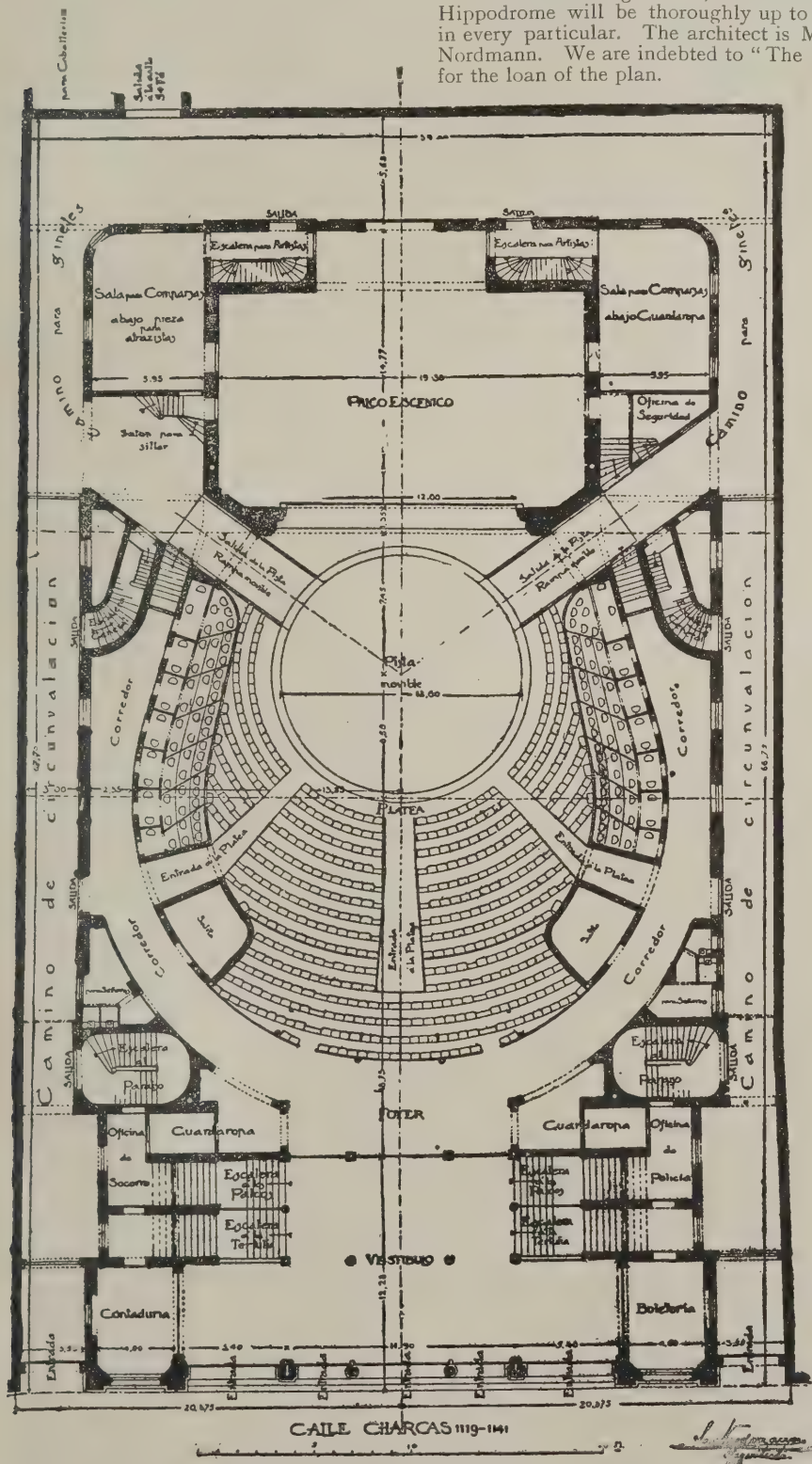
Just in front, seen through a forest of pillars, is a verandahed courtyard of great age. The architecture is of the kind invariable in religious buildings in Tibet. A double row of pillars carries the half-roof overhead, each supporting on a small capital a large bracketed abacus, voluted and curved on both sides and charged in the centre with a panel of archaic carving. The wooden doors which secure both entrances of the first court are of immense size, heavily barred, and embossed with very ancient filigree ring-plates. At the opposite end of the court an open door communicates with a second court, revealing a bright mass of hollyhocks, snapdragon and stocks, vivid in the sun. "The sanctity of the temple obviously increased as we ventured into this inner court," says the "Times" correspondent. "Its sides are honeycombed by small dark chambers, apparently built in the thickness of the enormous wall. Each is an idol-crowded sanctuary. Into these obscure shrines one stumbles, bent almost double to avoid the dirt of the low greasy lintel. Once inside, the eye requires some time to distinguish anything more than the dim outlines of an altar in the middle of the chamber . . ."

But the great object of interest is the Jo itself, beyond question the most famous idol in the world. This is in utter gloom and the floors around are slimy with grease, while the grime of a thousand years has utterly hidden the pictures—if there ever were any—on the walls. Thus is enshrined the great idol—a figure of Buddha bedecked with countless jewels of huge size, with a flawless turquoise 6 in. by 3 in. forming the centre of the crown on its head.

A SOUTH AMERICAN HIPPODROME.

WE reproduce on this page a plan of a theatre being erected in Buenos Ayres, and to be opened next April. Its full title will be the Coliseo Argentino and Teatro Circo—or in English the Argentine Coliseum and Theatre-Circus—and the owners are the Sociedad Anonima. Mr. Frank Brown, a theatrical entrepreneur who has performed with his own company for about sixteen years at the Teatro San Martin in Buenos Ayres, was struck with the London Hippodrome when visiting this country and decided to have one erected on the model of the Paris Hippodrome, on which the London Hippodrome was modelled. The building will

stand in a plaza, or garden square, on a very favourable site. The front or main entrance is in Charcas Street, while at the rear is Santa Fe Street. As the Hippodrome is isolated, windows are being arranged all round, which, with the sliding roof, will make the place very cool in summer. The stage has a depth of 50 ft. from the curtain line, and the proscenium opening is 40 ft. wide, while the sinking ring is 42 ft. in diameter. This latter part of the structure is being constructed in Paris at the establishment where the ring now used in the Nouveau Cirque was made. Provision is being made for seating 1,800 spectators, but there will be promenades in addition large enough to hold 1,000 more. Extensive stable accommodation, administration offices and out-houses are also being erected, so that the new Hippodrome will be thoroughly up to date in every particular. The architect is Mr. C. Nordmann. We are indebted to "The Era" for the loan of the plan.



NEW HIPPODROME, BUENOS AYRES: GROUND-FLOOR PLAN.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Liability to Kerb, Channel and Pave Road in Front of Houses.

CARDIFF.—A. H. writes: "I am building some houses fronting on a parish road in an urban district council district. This road has been metalled, sewered and lighted by the council, who also keep it in repair. I am informed by the council surveyor that before he passes the plans of my houses I must give him an undertaking to put kerb, channel and paving in front of them. Is it not the council's duty to do this, the road being a parish road? The council have not provided footpaths on either side of the road, but merely made and keep the carriageway in repair."

The urban district council are quite justified in asking you to reinstate the road when you open it, but I have some doubt as to whether they can legally compel you to add kerb, channel and paving to their footpath. I would advise that you ask the surveyor to state upon what he bases his contention—whether upon a by-law or otherwise. Possibly it would be judicious on your part to incur the expense of a proper footpath, but naturally one rather resents dictation.

F. S. I.

Renovating Oak Gates and Posts.

DORSET.—CHURCHWARDEN writes: "Some oak gates and posts erected at the entrances to a churchyard have been grained and varnished by an ignorant painter. What should be done in order to show the natural grain of the wood? I may say there are some severe shakes in the posts."

Burn off the paint, or take it off with paint remover; then scrape the surface clean, fill in any large cracks, and thoroughly rub the wood with boiled linseed oil.

Flow of Water in Pipes.

THAME.—E. P. writes: "Are the following formulæ the best to use for calculating the diameter of pipes, the length in yards and also the number of gallons delivered per minute?—

$$D = \sqrt{\frac{GL}{240H}} \quad L = \frac{(3d)^5 H}{G^2} \quad G = \sqrt{\frac{(3d)^5 H}{L}}$$

where D = diameter in inches, L = length in yards, and G = gallons per minute. I have failed to find in Box's 'Practical Hydraulics' the formula published on p. 153 of your issue for September 21st, namely, $\frac{G^2 L}{240d^5} = H$."

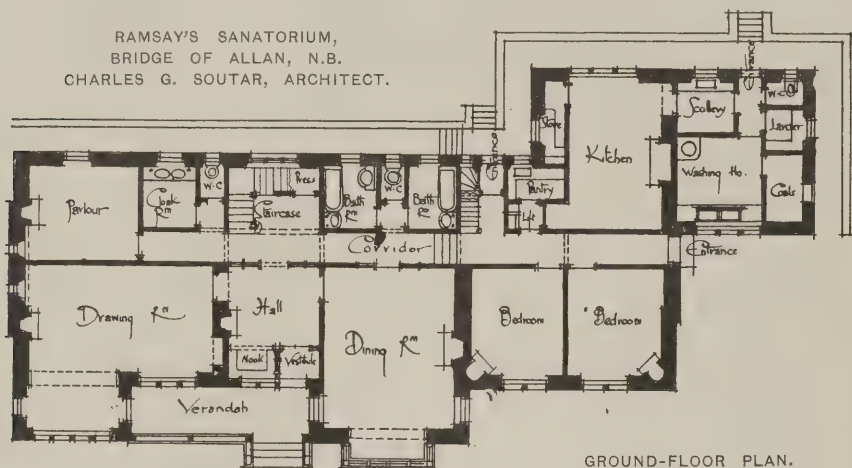
The following extract from the writer's "Engineers' Handbook," pp. 288-9 (Spon, 7s. 6d.), gives the simplest method of ascertaining the required particulars: "To find supply by given head through given lengths of various size pipes, assume a probable flow, then find the head necessary to produce the

velocity in the smallest pipe = $\frac{G^2}{215d^4}$. Then add the head necessary to overcome friction in each length of pipe separately by the formula $\frac{G^2 L}{240d^5}$, where G = gallons per minute, L = length in yards, d = diameter in inches. If the total found thus does not agree with the given head, the true discharge will be the assumed discharge \times sq. root of true head \div sq. root of head found above. This is without allowing for bends." The formula



This sanatorium for the cure of non-infectious ailments on rational and scientific lines is at present being erected on the higher ground of Bridge of Allan. The walls are of marl and the roof of red tiles. The public rooms and bedrooms all face south, and easy access has been arranged from the attic to the square tower. The architect is Mr. Charles G. Soutar, 30, Whitehall Street, Dundee, and the principal contractors are as follows:—Masonwork, T. S. Dick, Broughty Ferry; joiner-work, J. & W. Guthrie, Dunblane; plumberwork, MacLeish, Morrison & Co., Perth; slater-work, Brand & Son, Arbroath; plasterwork, J. Laburn, Dundee; glazier-work, W. G. Crichton, Stirling.

RAMSAY'S SANATORIUM,
BRIDGE OF ALLAN, N.B.
CHARLES G. SOUTAR, ARCHITECT.



GROUND-FLOOR PLAN.



you cannot find in Box's "Practical Hydraulics" (Spon, 5s.) is on p. 5, under the form $\frac{G^2 \times L}{(3d)^5} = H$, $(3d)^5$ being equal to $243d^5$.

HENRY ADAMS.

The Municipal Engineers' Specification.

THAME.—X. writes: "When will your 'Municipal Engineers' Specification' be ready?"

This work is now being actively prepared, but we cannot say definitely on what date it will be issued.

Patent Glazing.

BARNES.—T. A. H. writes: "Whose make of glazing bar, &c., is that shown by the accompanying sketch (not reproduced)?"

I do not know any make exactly like the sketch section sent, but it agrees most nearly with the "Perfection" glazing of Messrs. Helliwell & Co., 11, Victoria Street, London, S.W., and the "Unique" glazing of Messrs. Shelley & Co., 55, Lionel Street, Birmingham.

HENRY ADAMS.

Slaking Lime on Building Sites.

LONDON.—MUNRO writes: "What are the advantages or disadvantages of the custom prevalent in the North of dumping the lime on a site before building operations commence, then wetting it and covering with a

6in. layer of sand? It is afterwards mixed up in the usual way. Does this improve or deteriorate the strength and setting properties of the lime?"

The reasons for the custom referred to are often not appreciated by the contractors, who adopt the method because "it is the usual thing." It is mainly a matter of convenience. Slaked lime requires time to mellow, *i.e.*, to become thoroughly hydrated, cool and amorphous. If freely exposed to the air and allowed to dry it would absorb carbonic-acid gas, thus forming a certain quantity of chalk. This is decidedly advantageous after the mortar has been made and used, because it forms a somewhat hard skin or crust which resists the destructive action of rain and dust and sand particles driven by the wind; these would quickly weaken the mortar, which has little or no strength among its grains of sand unless the lime is of good hydraulicity (namely, of a composition which forms crystalline silicates of lime and alumina); more especially this applies to rain, because slaked lime is somewhat soluble in water. The advantage therefore of covering with sand is partly to prevent the hydrate of lime (*i.e.* slaked lime) drying out its water of hydration and absorbing carbonic-acid gas from the air; but its greatest convenience is that the covering of sand allows the lime to be conveniently stored on the site without

the necessity of erecting houses or other receptacles, efficiently protecting it from adulteration or being carried about the works by any traffic over it, or dirtying or injuring any materials or goods laid on the heap—in short, it is economical of storage room. For further interesting and instructive information on the setting of limes and cements see p. 43 of our issue for March 5th, 1902.

Colouring on Parchment.

BIRMINGHAM.—F. B. writes: "Which is the best way to prepare parchment for deeds for colouring?"

Use ox-gall with the colours or "pounce" the skin, *i.e.*, rub pounce into it with a rag.

Correspondence.

American Building Methods.

To the Editor of THE BUILDERS' JOURNAL.

CAMBRIDGE.

SIR,—I see by your issue for last week that you intend to illustrate the methods of construction to be followed in erecting the new Ritz Hotel in Piccadilly. By doing so you are putting us close into touch with modern American methods. After reading your preliminary remarks I examined the illustration to see whether there was really employed in the excavations a "steam navy" or "shovel" to load the debris into the carts. I presume that the job is hardly large enough to use such a contractor's appliance. This calls to mind the methods used some time ago in clearing the site for a railway extension in one of the large American cities, which consisted in destroying the property by blasting and then loading up the enormous amount of debris by means of a "steam navy," "shovel" or "excavator," as used in loading cement marl or raw material in American cement works. I would draw attention to an unusual piece of contracting work done a few months ago at the new cathedral of St. John, New York, consisting in erecting the huge columns in two pieces of stone



NEW PREMISES, DUNCAN STREET, LEEDS.
PERCY ROBINSON, ARCHITECT.

This building is now in course of erection on the side of Duncan Street recently widened by the Corporation. The materials are Accrington bricks with dressings of Morley stone, the shop front being in oiled teak. The site extends 40ft. back. The ground floor and basement are occupied by the shop, workshop offices, and stores, the upper floors being used for the owner's residence.

only. Operations equally striking are continually being carried out in the United States, and I venture to think this is due to the combination of building with civil engineering—using this latter in its broadest sense.—Yours truly, JAMES A. SMYTH.

The Savoy and the Gaiety.

To the Editor of THE BUILDERS' JOURNAL.

LONDON.

SIR,—Within the last few years many curious structures have been put up in London, and the skyline of some of them is particularly strange and fearful. One sees two notable examples of this when walking across Waterloo Bridge towards the Strand, for there, to the left, is the extension of the Savoy Hotel with its conglomeration of chimneys, tanks and turrets on the roof, and to the right what would seem to be a collection of monuments to departed spirits (Short's maybe); but, forsooth, the angelic figure is no other than the presiding goddess of the Gaiety perched on a ball above the dome, while for the rest it is mostly pokers, pokers by Mr. Norman Shaw-cum-Runtz on the adjoining hotel. From such a collection one turns to the City spires and the great dome of St. Paul's, with the range of buildings spreading like a curtain wall along the Embankment; and the contrast does not reflect glory on the Savoy or the Gaiety.—Yours truly, ONLOOKER.

Keystones.

Mr. H. A. Cheers, of Twickenham, is the successful architect in the competition for a new school to be erected by the Twickenham District Council.

The Organ in Bilton Church, Harrogate, is being renovated with all modern improvements and removed into the chancel, thereby providing increased seating accommodation in the north aisle. An organ-chamber and clergy and choir vestries are being built in harmony with the design of the late Sir Gilbert Scott. The estimated cost of the work is £2,500.

New School Buildings at Huntly—constituting a new wing to the Gordon Schools—have been erected from designs by Mr. R. G. Wilson, of Aberdeen. There are three classrooms on the ground floor, each accommodating sixty pupils, and a gymnasium 76ft. by 25ft. by 14ft. high. On the first floor are six classrooms similar to those below, with board-room and headmaster's and teachers' rooms at the ends.

Fall of a Cathedral Roof.—A large portion of the roof of the cathedral of St. Croix of Orleans has fallen in upon the high altar and destroyed the marble work. The Gothic and Romanesque cathedral of Orleans was mainly destroyed by the Huguenots in 1567 and afterwards rebuilt, the towers not being finished until the end of the eighteenth century. Most of it is a strange Renaissance imitation of Gothic principles, and the roof, which has just fallen in, dated chiefly from the seventeenth century.

The 500th Anniversary of the Death of William of Wykeham was marked by a special commemoration service in the chapel of Winchester College last week. The Arch-deacon of Winchester delivered an address on this celebrated man, in the course of which he said that even if the glorious sweep of the stone avenue in Winchester Cathedral and the exquisite beauty of the court of Winchester College did not themselves proclaim the master builder, the evidence of the parish churches throughout the land which came more immediately under his personal care would show the groundlessness of the modern heresy—that he had none of the artist's interest or skill in building.

The Norman Tower of Bledlow Church, Bucks, is to be restored.

London's Historic Houses.—The London County Council has issued a neat little pamphlet entitled "Indication of Houses of Historical Interest, Part I," price 1d.

Municipal and County Club.—The Lord Provost of Glasgow, Sir John Ure Primrose, Bart., will be the guest of the club at their house dinner at the Club House, Whitehall Court, on Friday, October 7th.

Messrs. E. H. Shorland & Brother, of Manchester, have supplied their patent Manchester stoves with descending smoke flues to the extensions at the union infirmary, Keighley, and to the city of Lincoln infectious diseases hospital.

The Need for Periodically examining Parapets, &c.—As a woman was passing the Metropolitan Music-Hall in Edgware Road last Friday morning a portion of the parapet, which had become loosened, fell and killed her.

An Arts and Crafts Exhibition in Leeds promoted by the Corporation, was opened to the public on Thursday. It is in the city art gallery of the municipal buildings, and includes examples of contemporary applied art, together with old furniture, &c.

New Business Premises in Wood Street, London, have been erected opposite St. Alban's Church from designs by Mr. George Vickery. The building is six storeys high and is largely constructed of steel and concrete. Messrs. Killby & Gayford, of Finsbury, are the builders.

Additions to Milner's Safe Works, Liverpool, are being erected. The new building will have a frontage of 300ft. in Aigburth Street and 127ft. in Smithdown Lane. The architect is Mr. F. H. Oldham, of Manchester, and the contractors are Messrs. W. Brown & Son, of Salford.

The Marylebone Council Chamber has been entirely refurnished by Messrs. Oetzmann & Co., of Hampstead Road, W., from designs by Mr. Herbert Cescinsky, furniture expert to the Metropolitan Asylums Board. The general style is early French Renaissance, the woodwork being of oak fumigated to a rich golden brown.

International Fire Service Council.—At the fourth general meeting held at Budapest on the occasion of the International Fire Congress, Mr. Edwin O. Sachs, chairman of the British Fire-Prevention Committee, was re-elected vice-president for the impending four years. It was decided to leave the office of president open. The next general meeting will be held at Milan in 1906.

St. Wilfred's Church, Bradford, in the Lidget Green district, is now being erected. It will consist of nave, north and south aisles, choir and vestries for clergy and choir. Seating accommodation will be provided for 620 persons. The cost will be about £8,500. Mr. Temple Moore, of London, is the architect and Messrs. J. Thompson & Co., of Peterborough, are the contractors.

To Restore the Bell Harry Tower of Canterbury Cathedral funds are now being raised. The tower is much decayed outside, mullions and pinnacles being dangerously unstable, but there are no cracks in the main walls. Mr. Caröe, the architect to the cathedral, also reports that the roofs of the south transept and of the western portion of the north aisle are urgently in need of repair, that the stonework in the upper walls of the nave is decaying in a similar manner to the great tower, that the window in the western gable is approaching a condition of considerable jeopardy, and that the nave pinnacles are now in an advanced state of decay. The cost of the necessary repairs to the central tower is estimated at £10,500, and for the rest £3,460.

A further submersion of the Temples at Philæ will take place when the dam at Assuan is heightened another six metres, which work is likely to be the first undertaken in connection with the future irrigation of Egypt.

Competition for Concert-Hall and Pavilion, Ayr.—The awards in this competition are as follows:—First premium (£58), Mr. J. K. Hunter, Ayr; second, Mr. Henry Higgins, junr., Glasgow, and Mr. Eric Sutherland, Glasgow, equal, £15 each. The hall is to be built on Low Green, at a cost of £9,000.

Changes of Address.—Mr. George H. Wenyon, architect and surveyor, has removed from West Bromwich to 9, Owen Street, Tipton.—Messrs. John Davis & Son, mining and electrical engineers, of Derby, have removed their London offices from 26, Victoria Street, Westminster, to Camomile Street Chambers, E.C.

New Regulations for Theatres and Music-Halls in Liverpool come into force on October 25th. Woodwork is to be painted with non-inflammable paint, and after July 1st, 1905, all scenery must be rendered and kept as fireproof as possible. There must be direct communication between the stage and the nearest fire-station.

A large Extension of the King's Norton Union Workhouse has been carried out at a cost of £31,759. A three-storey pavilion for 150 female inmates, new receiving wards, stores, &c., have been provided. Messrs. C. Whitwell & Sons were the architects, and Mr. Bernard Hall was the consulting engineer.

Two large Hospitals at Leeds, built at a total cost of £361,000 at Seacroft and Killingbeck by the Corporation, were formally opened last week. Mr. Edwin T. Hall, F.R.I.B.A., is the architect. The hospital at Seacroft is for the treatment of ordinary infectious cases, while that at Killingbeck is for small-pox patients.

The Old Town Baths, Eastbourne, are now approaching completion. They occupy a site adjoining the late Alderman Home-wood's house at Motcombe. The plans were prepared by the building surveyor (Mr. W. Chapman Field), and the work was secured by Messrs. Peerless, Dennis & Co., of Eastbourne, whose contract amounts to £3,548.

New Schools at Wyke, Bradford, have just been built. They comprise three blocks, the largest of which provides for 386 girls and boys. A second block accommodates 230 infants, and a third consists of workshops for cookery, laundry and wood work, and when completed will contain a swimming bath, gymnasium and other rooms; while a fourth block (or, rather, an extension of the first) is in course of erection for a boys' department with the same accommodation as the present mixed school. The architects are Messrs. Adkin & Hill, A.R.I.B.A., of Bradford, and the clerk of works is Mr. James Drake, M.I.C.W.A. The principal contractors are Messrs. H. Birkby & Sons, of Wyke, and the total estimated cost of the complete scheme is about £21,000.

Halifax's New Reservoirs.—Recently the members of the Halifax Town Council, together with a number of officials, visited Walshaw Dean, on the moors above Hebden Bridge, where three new reservoirs are in course of construction for the Corporation. They will increase the town's water-supply by about 2½ million gallons per day. The work, which was commenced about three years ago, has proved a somewhat difficult undertaking, chiefly owing to the trenches having to be carried to a much greater depth than was anticipated. Good foundations, however, have now been secured, and the work of "filling up" is in hand at the upper reservoir—indeed, this work is completed, and

excellent progress has been made with the construction of the embankments. Another $2\frac{1}{2}$ years it is expected will elapse before the reservoirs are completed. Their total cost is estimated at £250,000.

Breachwood Green Baptist Church.—The designs for this church submitted by Messrs. George Baines, F.R.I.B.A., and R. Palmer Baines, 5, Clements Inn, Strand, W.C., have been selected, and the work is to proceed at once. The building will accommodate about 400 persons in a mixed congregation, and the cost will be slightly over £1,500.

Ruskin House Chambers, Rugby, is now nearing completion from designs by Mr. Alexander Anderson, architect, of Northampton. It is situated in the centre of Regent Street, and consists of a shop on the ground floor with basement store under, offices on first floor, and a small flat above containing dining-room, kitchen, three bedrooms and the necessary offices. Mr. A. P. Hawtin, of Northampton, is the builder.

Carlisle Theatre is to be rebuilt—after the recent fire there.

St. Paul's Church, Covent Garden, has been completely renovated.

The Great Northern Hospital, Holloway Road, is to have a new surgery and operating theatre, two observation wards for casualty patients, and a complete installation of medical electrical apparatus. These improvements will cost £3,000.

New Receiving Wards at the Leeds Workhouse are being completed from designs by Messrs. Thomas Winn & Sons at a cost of about £7,000. The buildings are divided into two sections, one for men and the other for women. There is also to be a separate day-room and dormitory accommodation for children in each block and dormitory accommodation for the cases which the medical officer may consider advisable to retain sufficiently long to diagnose before sending into the hospitals.

A new Isolation Hospital for Men and a fever block are to be erected at the Lancaster County Asylum at a cost of about £20,000. Messrs. Willink & Thicknesse, of Liverpool, are the architects, and Messrs. J. Hatch & Sons, of Lancaster, are the contractors. The contract is the largest let locally for some time, and will stimulate the building trade at Lancaster, which has been depressed.

Euston Road Widening.—The General Purposes Committee of the St. Pancras Borough Council consider that it is most desirable that Euston Road should be widened near its junction with Tottenham Court Road and near the new station to be erected by the Charing Cross, Euston and Hampstead (Tube) Railway Co. In the event of the London County Council being prepared to acquire the necessary land to widen the roadway to 60ft., the committee recommend the borough council to contribute one-eighth of the nett cost of the improvement.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Oct. 6	Clayton, Yorks—Extension of Weaving Sheds	Corporation	Milne & France, Architects, 99 Swan Arcade, Bradford.
" 6	Grimsby—Buildings	Urban District Council	H. Gilbert Whyatt, Borough Engineer, Town Hall Square, Grimsby.
" 6	Walthamstow—School Buildings	Town Council	H. Prosser, Education Committee Offices, High Street, Walthamstow.
" 6	Weymouth—Wall	Electric Lighting and Tramways Committee.	Borough Engineer's Office, Market Street, Melcombe Regis.
" 6	Dudley—Extensions to Engine-Room	Lennard's, Ltd.	R. P. Wilson, 66 Victoria Street, S.W.
" 6	Tonypandy—Rebuilding Premises	Wandsworth Borough Council	R. S. Griffiths, Excelsior Buildings, Tonypandy.
" 6	London, S.W.—Disinfecting Station	Corporation	Surveyor's Office, 215 Balham High Road, S.W.
" 7	Southwold, Suffolk—Dwellings	Guardians	E. R. Cooper, 1 Market Place, Southwold.
" 8	Birkenhead—Laundry Buildings, &c.	Corporation	E. Kirby, 5 Cook Street, Liverpool.
" 8	Exeter—Car Depot	Renfrew and Clydesdale Joint Hospital Board.	T. Moulding, City Engineer, 7 Southernhay West, Exeter.
" 8	Blawart Hill—Brickwork	Metropolitan Railway Co.	Stewart & Paterson, 14 Blythswood Square, Blawart Hill, Glasgow.
" 8	London—Stores	Magor District Council	R. H. Selbie, Secretary's Office, 32 Westbourne Terrace, W.
" 8	Caerleon—Repairs	Renfrew and Clydesdale Joint Hospital Board.	Union Offices, Queen's Hill, Newport, Mon.
" 8	Renfrew—Hospital Extension	Urban District Council	Stewart & Paterson, 14 Blythswood Square, Glasgow.
" 10	Malvern—Library	Education Committee	Clerk to Council, District Council Offices, Malvern.
" 10	Bradford—Schools	Thompson & Son	Architect's Department, Education Office, Manor Row, Bradford.
" 10	Belfast—Premises	Urban District Council	Mr. Hunter, Scottish Provident Buildings, Belfast.
" 11	Carmarthenshire—Additions, &c.	Commissioners	W. D. Jenkins, Shire Hall, Carmarthen.
" 11	London—Erection of Front Block, Northern District P.O.	Conservative Club	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 11	Treharris—Alterations to House	Glamorgan County Council	William Dowdeswell, Architect, Treharris.
" 12	Pengam, Glamorgan—Laundry	Gelligaer and Rhigos R.D.C.	T. M. Franken, Glamorgan County Offices, Westgate Street, Cardiff.
" 12	Pembank, near Fochriw—Alterations, &c., to Hospital	Bucks County Council	P. Vivian Jones, Architect and Surveyor, Hengoed.
" 12	Loudwater—Cottages	Rural District Council	R. J. Thomas, Surveyor, County Hall, Aylesbury.
" 12	Kilkeel—Cottages	Walthamstow U.D.C.	Engineer to Council, Castlewellan.
" 12	Chingford, Essex—Extension to Hospital	Rural District Council	G. W. Holmes, Town Hall, Walthamstow.
" 12	Hollingbourne—Repairs to Laundry, &c.	Isolation Hospital, Hollingbourne.	Superintending Civil Engineer, H.M. Breakwater Works, Portland.
" 14	Osmington, near Weymouth—Coastguard Buildings	Guardians	B. J. Francis, Architect, Abergavenny.
" 14	Abergavenny—Free Library Reading-Room	Rural District Council	H. W. Chattaway, Trinity Churchyard, Coventry.
" 15	Meridan, Coventry—Residence, &c.	Guardians	G. F. Ashton, Clerk, 71 High Street, Runcorn.
" 15	Runcorn—Engine-House	Guardians	J. Cook Rees, Architect, Neath.
" 15	Seven Sisters, Wales—Chapel	Managers of Poplar and Stepney Sick Asylum.	H. Belch, Architect, Chesham.
" 17	Amersham—Infirmary	Urban District Council	Office of Carpenter in Charge, Queen's College, Cork.
" 18	Corkbeg, co. Dublin—Coastguard Station	Urban District Council	J. W. Clarkson, 136 High Street, Poplar.
" 18	London, E.—Additions to Stores' Department	Corporation	T. F. Harvey, Town Hall, Merthyr.
" 18	Merthyr Tydfil—Pavilions	Borough Council	H. Williams, Secretary, Office of Public Works, Dublin.
" 18	Londonerry—Alterations, &c., to Post Office	Town Council	Town Clerk, 16 London Road, Chelmsford.
" 18	Chelmsford—Road Pumping Station	Urban District Council	O. E. Winter, Borough Engineer, Town Hall, Hampstead.
" 19	Hampstead—Buildings	Corporation	Superintending Engineer, H.M. Naval Establishment, Rosyth, Inver-keithing, N.B.
" 21	Cockburnspath, Berwick—Coastguard Buildings	Urban District Council	E. J. Bennett, 191 Parrock Street, Gravesend.
" 24	Gravesend—Public Library	Urban District Council	J. Rees, Hillside Cottage, Pentre.
" 28	Rhondda—School	Urban District Council	H. W. Cook, Public Offices, Egremont, Cheshire.
" 31	Wallasey—Public Offices	Corporation	W. E. Mills, 12 Horse Fair, Banbury.
No date	Banbury—Alterations		J. A. Lucas, Architect and Surveyor, Guildhall Chambers, Exeter.
"	Exeter—Residence		
ENGINEERING:			
Oct. 6	Arnsdale and Burton, Westmoreland—Sewage and Water-works.	S. Westmoreland R.D.C.	A. Milne, Clerk, Lowther Street, Kendal.
" 6	Basingstoke—Well, &c.	Water Supply Committee	F. R. Phipps, Boro' Surveyor and Engineer, Town Hall, Basingstoke.
" 6	Brailes, Banbury—Extension, &c., of Water Supply	Rural District Council	E. R. Gander, Inspector of Nuisances, Brailes, Banbury.
" 6	Weymouth—Wiring	Town Council	Borough Electrical Engineer, Sunnybank, Westham.
" 7	Cladnageragh, Ireland—Timber Jetty	Renfrew and Clydesdale Joint Hospital Board.	H. Williams, Secretary, Office of Public Works, Dublin.
" 8	Blawart Hill, Glasgow—Excavations	Tramways Committee	Stewart & Paterson, 14 Blythswood Square, Blawart Hill, Glasgow.
" 10	Ipswich—Boiler	Town Council	Kennedy & Jenkin, 17 Victoria Street, S.W.
" 10	Ludlow—Sewage-disposal Works	Urban District Council	J. H. Williams, Town Clerk, Ludlow.
" 10	Pontypridd—Steam Motors	Port Commissioners	P. R. A. Willoughby, Engineer to Council, Council Offices, Pontypridd.
" 10	Calcutta—Plant	Corporation	J. H. Apjohn, 17 Victoria Street, S.W.
" 10	Swindon—Watermains	Southern Mahratta Ry. Co., Ltd.	H. J. Hamp, Town Hall, Swindon.
" 11	London, E.C.—Engines and Tenders	L.C.C.	E. Z. Thornton, 46 Queen Anne's Gate, S.W.
" 11	London, S.W.—Steam-exhaust Pipes	Harbour Trustees	County Hall, Spring Gardens, S.W.
" 12	Lerwick Harbour—Extension to Harbour	County Council	J. Barron, Central Chambers, 216 Union Street, Aberdeen.
" 12	Espinara, Spain—Electric Lighting	Urban Council	Offices of the Alcadia Constitucional of Espinar.
" 12	Middlesex—Bridge Work, &c.	Town Council	H. T. Wakelam, County Engineer, Guildhall, Westminster.
" 12	Athlone, Ireland—Oil Engine	Municipality of Ghent	P. J. Prendergast, Athlone.
" 14	Keith, N.B.—Waterworks	Great Northern Railway Co. (Ireland).	L. B. Barclay, Borough Surveyor, Keith.
" 17	Antwerp—Electric Cranes	Harbour Trustees	Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
" 17	Dublin—Bridge Works	Brazilian Central Railway Co.	W. H. Mills, Engineer-in-Chief, Amiens Street, Dublin.
" 20	Swansea—Boiler		A. O. Schenk, Harbour Offices, Swansea.
" 22	Bahia, Brazil—Railway		Secretary of Agriculture, Bahia, Brazil.
" 31	Rio de Janeiro—Machinery, &c.		Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
1905.	Shanghai—Electric Tramways		Pook & Co., Agents for Municipality of Shanghai, 63 Leadenhall Street, E.C.

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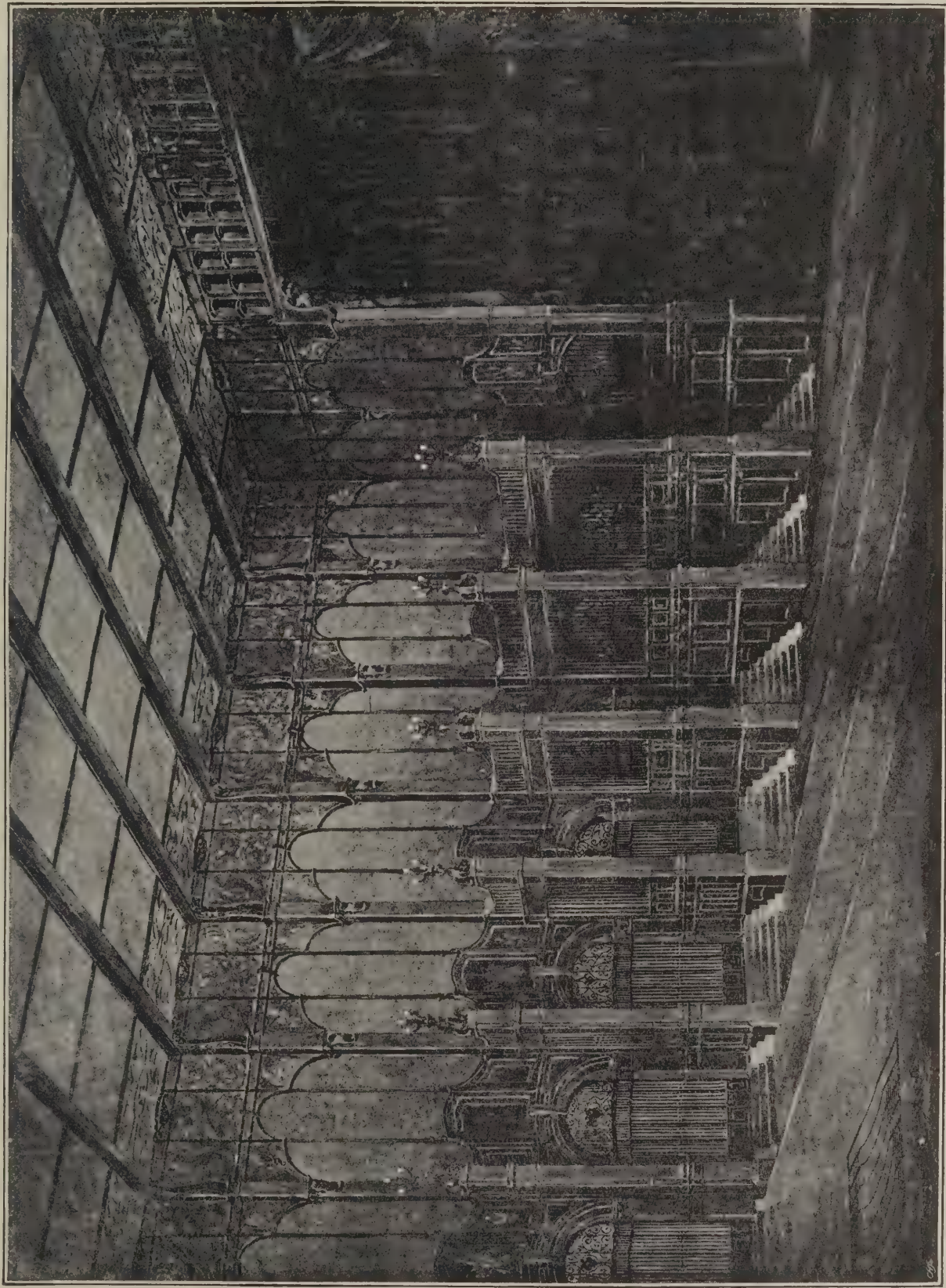


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PROPOSED FESTIVAL THEATRE: THE AUDITORIUM. EDWIN O. SACHS ARCHITECT.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

October 12, 1904. Vol. 20, No. 505.

6, Great New Street, Fetter Lane, E.C. 4.

Summary.

At the new Sessions House now being erected in Old Bailey, the contractors, Messrs. Holloway Brothers, are using a travelling gear by which stones can be taken with ease to any part of the wall. The tackle travels on the lower flange of steel joists which run the whole length of the frontages. (Page 190.)

Flats for necessitous officers' widows and daughters, where they can live free of rent and taxes, are now being provided at Wimbledon. (Page 197.)

Experiments with plain and reinforced concrete beams show that rupture begins at an elongation about the same in both cases. In the plain concrete total failure ensues at once; in the reinforced concrete rupture occurs gradually, and many small cracks may develop so that the total elongation at final rupture will be greater than in the plain concrete. In other words, the steel develops the full extensibility of a non-homogeneous material that otherwise would have an extension corresponding to the weakest section. (Page 193.)

In a case for damages brought against the Bermondsey Borough Council last week, Judge Addison held that if sanitary inspectors made a *bonâ-fide* mistake as to the relaying or repairing of drains the council could not be held liable. (Page 197.)

Chicago is providing a regular system of underground tunnels for freight and merchandise. Coal, instead of being taken through the streets, is now delivered by the tunnel cars into the basements of buildings, and ashes taken away similarly. (Page 188.)

The Champs-Élysées is to be extended to the forest of St. Germain, at a cost of £400,000. (Page 195.)

An entirely new sort of wood-paving—camphor wood—is to be tried for four years in Buckingham Palace Road. (Page 195.)

"Bedlam," with its grounds, is proposed to be acquired by the City Corporation for a park or open space. (Page 195.)

An extraordinary scene occurred in Paris last week when a builder who had refused to pay his men was walled up in his office from 8 in the morning till 5 in the evening. (Page 199.)

The importation of timber in September from practically all countries was small. There are not wanting signs of a more hopeful feeling in the future of the market generally, which can only be encouraged by a moderate autumn importation, as it must be remembered that the trade of the country is none too good, and the consumption of wood has been falling off to some extent. (Page 190.)

The £150 Cottage.

WE welcome the suggestion of Mr. J. St. Loe Strachey that an exhibition of cheap houses should be held in London with the object of showing what can be done in the way of providing a dwelling-house that may be let at a rent within the reach of the agricultural labourer, at the same time giving a reasonable return on the outlay. Such an exhibition, well supported and thoroughly representative, would, we think, be of very considerable service in bringing many new forms of construction to the notice of those interested in this question. There is a crying need for dry, habitable small houses in the country: indeed, in many instances, houses which are not properly habitable, being damp and insanitary, find ready tenants because their rents are low and the people must live somewhere. But the matter should not be left in that state. There have been landowners and squires who have erected good cottages for the persons employed on their estates, even at a monetary sacrifice, but the ordinary landlord can hardly be expected to act the philanthropist in that way. However much he may wish to see people housed in cheap cottages, it may not be within his means to do so under the by-laws which rural councils have the power to enforce. On former occasions we have taken our part in protesting against the unnecessary restrictions which are now imposed on buildings in districts far away from towns. By-laws of a sort there certainly must be, else cottages might be built in disregard of every sanitary requirement, but there is a limit to such regulations, which limit is grossly exceeded under the present code. More especially, there is no notice taken of new methods of construction. The age of building with bricks and stone alone is past: we have steel and concrete and a score of patent materials ready to hand now, and we should be enabled to take advantage of these in the erection of cheap cottages for the labouring classes. Mr. St. Loe Strachey says that an agricultural labourer, even if he is in constant employment, cannot afford to spend more than 3s. a week for a cottage, or £8 a year, and this, under existing conditions, is not enough to pay interest on capital, rates, insurance and repairs. At present a cottage in the country, with a garden, generally costs £250, and this allows only the smallest margin for fencing and laying-out the site. But 4 per cent. on £250 means £10: rates account for another £1; and insurance and annual repairs must be placed at £1 at least. Therefore, even if nothing is put for depreciation and management, it is impossible to make cottage building pay even a very moderate return unless the cottage, when

built, will let for at least £12 per year. The question is, can a cottage with three bedrooms, living-room, kitchen and scullery be built for £150 (not counting anything for the site or water-supply) and be let at £8 a year? Mr. Strachey is of opinion that such a cottage cannot be built under the present by-laws. He is only partly right, however. Landowners often go to architects for the design of cottages on their country estates, and however desirable this is from an artistic point of view, and as regards good planning, it must be confessed that cottages can be erected very much more cheaply by the speculative builder. We know from facts which we can vouch for that numbers of suburban houses containing two reception-rooms, three bedrooms, kitchen, scullery, bathroom, two w.c.'s and cellar have been erected by speculative builders at a prime cost of £250, and sold for £275, under the strict by-laws of London. This of course means the careful saving of every penny, the use of stock doors, mouldings, grates, ironmongery, &c., and very often shoddy methods. In the country cheaper labour and less accommodation should enable cottages to be built at £150. We suggest that a committee of the Institute and the Master-Builders' Association should draw up stock plans and standard sizes and details. The by-laws undoubtedly need to be reformed, and we have little doubt that the criticism now being levelled at them will effect its purpose. Meanwhile we may consider what is at hand, what new materials, what new methods of cheap building. An exhibition would be the best means of bringing these to public notice. We are sure it would find general support and prove advantageous to the exhibitors.

The Victoria Memorial.

Good progress is being made with the alterations in front of Buckingham Palace. The new and straightened Mall, laid with wood blocks, is now finished, except for the special lamp standards that have been designed for it (those now in position being only temporary), and the segmental gardens on either side of the memorial area are bright with grass and flowers. Against the lake a massive wall has been built and the low balustrading around the enclosure is complete. The appearance of these finished portions is decidedly pleasing, though we shall always regret that the roadways were brought inside what was to be called the "Queen's Garden." Just at present the workmen are engaged on the alterations to the railings and forecourt of the palace. The new gateways are being erected and it will not be so very long before the work is finished. Till then the total effect cannot be gauged, but it promises well now.

UNDERGROUND TUNNELS FOR TRAFFIC.

By E. KILBURN SCOTT, A.M.I.C.E.,
M.I.E.E.

WHEN streets become congested, as they are in London and New York, the first thing the authorities do is to provide for underground travel. Now, seeing that the congestion is mainly due to vans and lorries, &c., it would seem to be saner and more desirable to keep the people in the air and sunlight, and banish the freight, coal merchandise and all ungainly and unsightly parcels to the underground tunnels.

It is interesting to note that this is the view which has been taken at Chicago, where the Illinois Tunnel Co. has built, or is building, tunnels under all the principal streets, hauling the merchandise of the city through them by electric locomotives.

In Chicago about 100,000 tons of freight, requiring 30,000 vans or lorries, is handled daily, and a large part of this in the square mile, or "the loop" as it is called, in the business part of the city. As all the streets are paved with setts, and all the tramcar and elevated railway routes, to say nothing of the main railway lines, centre in and around the loop, the noise and confusion can be imagined.

To give some idea of the amount of traffic which centres at Chicago, it may be stated that 35 per cent. of the entire mileage of the United States railways, represented by twenty-five separate railway companies, terminates in Chicago. It is estimated that the carriage of freight from these various railways amounted in 1903 to no less a sum than ten million pounds sterling.

Under ordinary conditions with drays and vans, the useful working day is confined to eight or nine hours, but on wet days, or when there is snow or frost, the working day may be much less. Now directly underground carriage is substituted the problem solves itself, for then the whole of twenty-four hours can be utilized, and that quite independent of weather conditions.

The amount of coal handled yearly in Chicago for office buildings and tenement houses alone amounts to eight million tons, and as it is all of the soft, bituminous kind, considerable discomfort was caused by taking it through the streets, in addition to which there was the removal of the resulting ashes, &c. With the tunnel system, the coal is now being delivered direct to the furnaces, which are in the basements of the buildings, and the ashes are removed therefrom with a minimum of trouble.

The tunnels are horse-shoe shaped and have walls of concrete, the top being 24ft. below the street surface. They are being driven under all the principal streets and under the river, so that every division of the city will eventually be reached.

The road-bed is of concrete, with 56lb. rails and cast-iron chairs without ties. The cars are of steel, each having a capacity of 7 tons of coal or twenty-four barrels of flour or sugar. The electric locomotives give a drawbar pull of 8,000 lbs., and direct current at 500 volts is picked up from a third rail laid down the centre of the track. It should be noted that the tunnels are not for passenger traffic but for freight.

The connection from the tunnel to the railway terminal platforms is being made by inclined grades of 9 in 100, fitted with a steel rack like a mountain railway. The rack, however, in this case forms the third rail and the cogwheel takes the current.

Delivery or collection of freight with existing buildings is made by means of elevators on which the cars are lifted to the basements of the buildings. In all new buildings, however, the architects are arranging for the basement-floor level to be even

with the road-bed of the tunnel, and in making the excavations for these new buildings the great advantage of the system is being thoroughly demonstrated. The soil is loaded into cars and passed away to Grant Park, on the Lake front, thus relieving the streets of the unsightliness, dirt and disorder usually attending a considerable work of excavation.

To every impartial-minded person there is no doubt that Chicago has hit upon the right plan for dealing with congested traffic, and the authorities are to be congratulated in giving the franchise for this novel system to such an original and live concern as the Illinois Tunnel Co. This is not the only good service the company is doing for Chicago. It has established and amply proved the success of an automatic telephone system, which has been well described as the only "girl-less, cussless, and out of orderless system." This enables its customers to secure immediate communication without the intervention of a third party; there is therefore no breaking in, no cutting out or listening—in fact, none of the annoying features of the manual board system.

The problem of dealing with the vast amount of street traffic in London is becoming more acute every year. The Traffic Commission are now considering what shall be done, and it is to be hoped they will formulate some practical scheme that will rid Londoners of the nuisance caused by interminable lines of vehicles.

OUR PLATES.

THE problem of designing a festival theatre for the presentation of grand drama of national character, and for the performance of serious musical productions, such as oratorio, has frequently been the subject of thought amongst architects, more particularly Continental architects. Men of the standing of Charles Garnier, Gottfried Semper and Baron Hasenauer, of France, Germany and Austria respectively, have all devoted time to problems connected with this subject, and Gottfried Semper in particular was most successful, inasmuch as his ideas first served as a basis for the Baireuth Wagner Theatre, which—although but a ramshackle structure of a semi-temporary character—embodies much that is of importance to theatre designers, and has latterly again served as a basis for the People's Theatre at Worms and the Regent Theatre at Munich. An English architect in practice somehow does not receive that encouragement for dealing with the more ideal problems of his profession as is the case with his colleagues abroad. To attempt to lay down new principles of plan or design almost invites in this country criticism of an unkind character. Such studies are considered to savour of crankiness, of leisure hours that might be more profitably employed in practical everyday work, &c. Yet we give in this issue an example where a busy architect, Mr. Edwin O. Sachs, has put on paper his idea as to what should be the character of a festival theatre for this country, and for London in particular. It will be observed that Mr. Sachs desires the auditorium of the theatre to be in the form of a segmental amphitheatre, somewhat on the Baireuth lines, but with the great difference of having architectural pretensions and such dignity as we should associate with the idea to be embodied in a festival playhouse, where the application of the gaudy styles of theatre decoration (to which we are unfortunately all too accustomed) would be very much out of place. The acoustical problem for this auditorium has been most carefully considered; also the equality in value of the seating and sighting. Unfortunately we cannot reproduce the colour study of the design, in which a dark red forms the

principal factor, though much depends on it. Every three rows of "stalls" have their own exits at either side, and thus the problem of symmetrical and easy egress has also been dealt with. The stage has what is known as a double proscenium, the orchestra being situated between the outer proscenium line and the proscenium proper. There are no galleries or tiers of any kind beyond a raised centre box at the back for the use of special visitors. In designing the exterior Mr. Sachs has assumed that a festival theatre must be situated in the open, preferably in a public park, and raised above the surrounding levels. He clearly shows the lines of his plan on the exterior, where the curvilinear front is strongly marked. An outline plan is given on the left-hand bottom corner of the interior view. Red bricks with stone facings are proposed for the exterior. Allowing for the more modern forms of stage mechanism and every up-to-date appurtenance, such a festival theatre is estimated to cost £80,000. Mr. Sachs, as we know, has very strong views regarding the beneficial effect of national theatres as an element in the education of coming generations, and he bases these views on the experience obtained in other countries from the systematic encouragement of grand drama at popular prices for educational purposes.

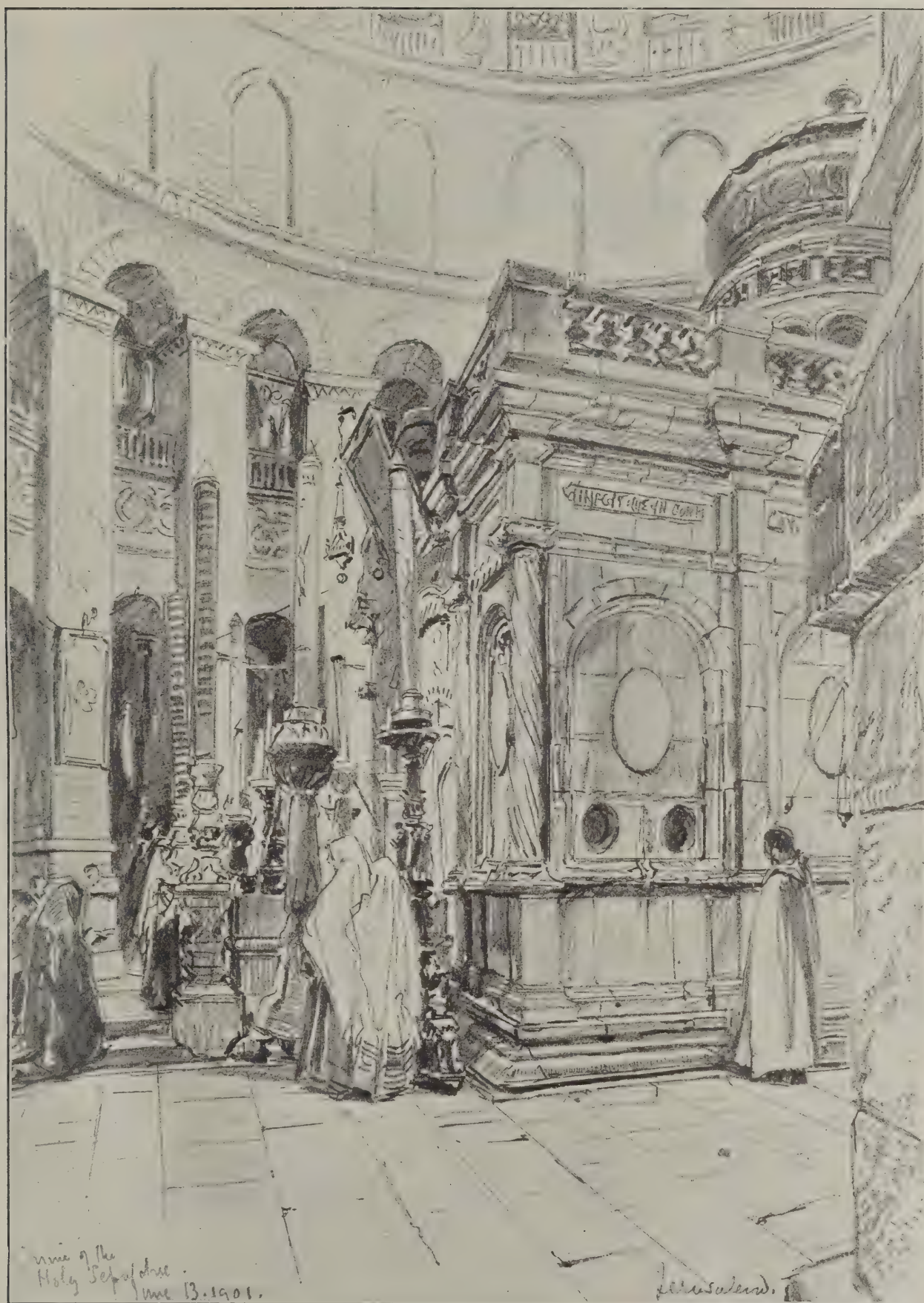
The two seaside houses at Frinton, Essex, have recently been erected from designs by Messrs. Harrington & Ley, architects, of London and Frinton. They have been planned to suit the special requirements of seaside residents, and, in addition, one of them is adapted for the professional occupation of Dr. Bell. Externally the houses have red-brick bases with the upper part of the walls finished with white pebble dash and half-timber work in places, the roofs being covered with red tiles.

DRAWINGS OF ARCHITECTURE.

MR. JOHN FULLEYLOVE, R.I., is best known for his colour work. As, however, we should be unable to give the essential quality of such work—the colour itself—we have preferred to illustrate one of his pencil drawings. The reproduction on the opposite page is a very true one, retaining all the charm of the original, so far as it is possible for a reproduction to do. The drawing is a fine example of pencil work. It is very suggestive in its treatment, and the architecture is indicated with that care and precision which Mr. Fulleylove has acquired by making multitudinous studies of such subjects; while the figures at once proclaim the artist hand.

This series of illustrations which we have been publishing for the past twelve months has met with wide approval. This encourages us to continue it. We have still to illustrate the work of a number of well-known men, in addition to those already represented in the following issues:—

The late Mr. H. W. Brewer	-	-	November 11th, 1903.
Mr. Raffles Davison	-	-	Do.
Mr. W. H. Bidlake	-	-	November 11th, 1903, and January 6th, 1904.
Mr. E. H. New	-	-	November 18th, 1903.
Mr. George C. Haité	-	-	Do.
Mr. James B. Fulton	-	-	December 2nd.
Mr. Percy Wadham	-	-	Do.
Mr. M. H. Baillie Scott	-	-	Do.
Mr. H. Raine	-	-	December 16th.
Prof. Beresford Pite	-	-	December 23rd.
Mr. T. M. Rooke	-	-	Do.
Mr. C. E. Mallows	-	-	December 30th.
Mr. C. W. English	-	-	Do.
Mr. Hedley Fitton	-	-	Do.
Mr. Muirhead Bone	-	-	January 6th, 1904.
Sir Charles A. Nicholson	-	-	January 13th.
Mr. Patten Wilson	-	-	Do.
Sir Edward J. Poynter	-	-	January 27th.
Mr. A. N. Prentice	-	-	Do.
Mr. Oliver Hall	-	-	March 9th.
Mr. Walter Millard	-	-	March 16th and May 11th.
Mr. H. Morley	-	-	March 23rd.
Mr. Alexander McGibbon	-	-	April 6th.
Mr. Frank L. Emanuel	-	-	August 3rd.
Mr. Percy E. Nobbs	-	-	Do.
Mr. F. L. Griggs	-	-	August 10th.



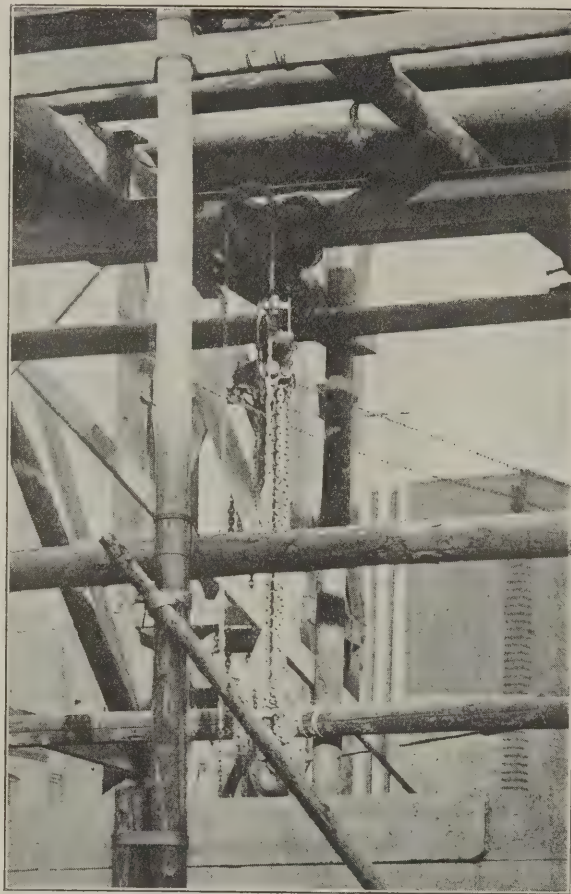
DRAWINGS OF ARCHITECTURE: JOHN FULLEYLOVE R.I.

HANDLING STONEMWORK.

A new Device in use at the Sessions House.

AMONGST modern appliances for the handling of heavy material during the course of building operations none is more ingenious than the travelling gear which has been devised by Messrs. Holloway Brothers, of Westminster, and now in use by them at the new City Sessions House being erected upon the site of Newgate Prison. In common with most ideas of a more or less revolutionary nature, the one under notice is extremely simple, and when looking back on the amount of labour spent in handling the stonework of London's great buildings it remains a matter for wonder that some such contrivance was not thought out before.

An understanding of the magnitude of the job of erecting the new City Sessions House may be gathered from the illustration shown on the opposite page, which gives a general view of the works with the three derricks which have been found necessary to command the whole of the site. The photograph is taken from the junction of Newgate Street and Holborn Viaduct, from a point opposite the Old Bailey thoroughfare.



STONE-HANDLING GEAR IN USE AT THE NEW SESSIONS HOUSE IN OLD BAILEY.

The method adopted by Messrs. Holloway for handling the huge blocks of masonry for incorporation into the building is as follows. The stone is first hoisted by the derrick cranes and lowered on to the scaffold at a point approximating to that where it is to be built in. Deposited here, it is lifted by the endless chain tackle shown in the photograph above; and, this tackle being free to travel along the lower flanges of a rolled steel joist, the stone is taken to the precise spot required and gently lowered on to its prepared bed. The steel joists run the whole length of both frontages of the building so that the stone may be dumped at any required point in the walling; but it is necessary that their lower flanges should be free for the progress of the traveller, and the joists are therefore (as will be seen in the illustration) suspended from timbers laid across the scaffold ledgers. Upon these balks of timber, iron plates are laid at intervals, with holes drilled corresponding to those in the upper flange of the steel joists, through which bolts are passed (four to each plate) and screwed up.

The traveller is a compact little device, and consists practically of two plates bolted together, with cogged wheels running on the flanges of the joist on either side of the web. Its run is manipulated by a third wheel, clearly seen in the illustration, with a chain suspended for handling. The endless chain is hooked through an eye in the traveller, and does not differ from the ordinary tackle of this kind.

From this brief description it will readily be appreciated that a contrivance of this nature is as effective in every way and answers the same purpose as a gantry with a travelling crab, allowing for the deposit of its load at the precise spot required. The saving in labour with such an appliance must be enormous; in addition must be reckoned the minimizing of the risk of damage to the faces of the stones, which so often happens when they have to be manipulated

into their resting-places. It will be understood that as the walls progress and the scaffolding is raised these steel joists are easily unbolted and taken a stage higher.

THE TIMBER TRADE.

London Market in September.

THE feature of September was the small importation from practically all wood-producing countries into the London market, and although the deliveries in September were some 6,000 standards below those of September, 1903, most of this deficiency was in the overside deliveries, which vary month by month according to the importation. There are not wanting signs of a more hopeful feeling in the future of the market generally, which can only be encouraged by a moderate autumn importation, as it must be remembered that the trade of the country is none too good and that the consumption of wood has been falling off to some extent.

Prices have now reached a level below which it is unreasonable to expect them to fall materially, and buyers, realizing the position, are more inclined to operate at shippers' reduced figures. The London market, after months of bad trade and falling prices, is looking more hopeful, not so much in consequence of any improvement in the demand, but because the autumn supply appears likely to be lighter than usual; it must be remembered in this connection, say Messrs. Churchill & Sim, the well-known timber brokers, that the supply is still ample to meet all probable calls upon it, and that any considerable shipment of unsold balances to this side would have the effect of shaking buyers' confidence in the market at a time when it is just beginning to be apparent.

As regards the hardwood market, Messrs. Denny, Mott & Dickson report that, in respect of volume, the business of last month has perhaps been the worst of the year. Nevertheless there has been a marked steadiness in prices all round, as, short of a financial panic, it is increasingly recognized that there is nothing in sight to further lower f.o.b. prices or freights. It only remains that the position should improve all round, always subject to stocks not being thrown on the market, through the exigencies of weak holders towards the end of the remaining quarter of a very trying year.

The abstract of stock, consumption &c., for the month of September published by Messrs. Foy, Morgan & Co., is given in the tables at the foot of this page.

Dock Stocks in September.

Summarizing this, we find the stock of wood in the public docks on September 30th was:—

	Pieces.
Foreign deals and ends - - -	2,278,000
Do. battens - - -	3,301,000
Do. boards, rough - - -	4,558,000
Do. do. prepared - - -	7,093,000
Colonial pine, deals and battens - - -	1,173,000
Do. spruce do. do. - - -	962,000

Totalling 19,365,000 pieces as against 20,546,000 pieces in September, 1903, and 23,475,000 pieces in September, 1902. In every kind there is a diminution.

In other kinds the stock was as follows:—

	Pieces.
Foreign wainscot logs - - -	549 pieces.
Do. oak timber - - -	986 loads.
Do. fir timber - - -	805 do.
Do. Oregon pine, &c., spars and masts - - -	4,137 do.
Colonial oak timber - - -	1,544 do.
Do. birch timber and planks - - -	3,483 do.
Do. elm and ash timber - - -	1,244 do.
Do. yellow pine - - -	884 do.
Do. red pine - - -	255 do.
United States pitch-pine timber - - -	25,546 do.
Do. do. deals - - -	78,000 pieces.
East India teak - - -	9,603 loads.

Dock Deliveries for Nine Months.

The deliveries for the first nine months at the public docks have been:—

	Pieces.
Foreign deals and ends - - -	2,553,000
Do. battens - - -	4,732,000
Do. boards, rough - - -	4,224,000
Do. do. prepared - - -	12,187,000
Colonial pine deals and battens - - -	831,000
Do. spruce do. do. - - -	1,234,000

S.C. Dks. and M. Dks.	Deals (Fir).	Battens (Fir).	Pine.	Spruce.	Pitch-pine Deals.
Public dock stock - - -	Pieces. 1,880,771	Pieces. 3,620,811	Pieces. 1,174,352	Pieces. 961,451	Pieces. 77,221
Monthly public dock stock consumption - - -	241,756	500,469	89,555	96,467	7,967
Overside stock - - -	763,949	1,581,482	282,994	304,836	—
Overside consumption (estimated of dock):—					
78 per cent. Sawn - - -	188,570	390,366	69,853	75,244	—
51 " Planed - - -					
Duration of supply at same rate of consumption - - -	6'15 months.	5'84 months.	9'14 months.	7'37 months.	9'69 months.

S.C. Dks. and M. Dks.	Deals and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
Public dock stock - - -	Pieces. 7,714,606	Pieces. 4,557,842	Pieces. 7,092,396	Loads. 32,725
Monthly public dock stock consumption - - -	936,214	466,084	1,171,385	3,482
Overside stock - - -	2,933,261	1,472,825	468,554	—
Overside consumption (estimated of dock):—				
78 per cent. Sawn - - -	724,033	363,546	597,406	—
51 " Planed - - -				
Duration of supply at same rate of consumption - - -	6'41 months.	7'27 months.	4'27 months.	9'40 months.

A total of 25,761,000 pieces as against 27,636,000 in 1903 and 29,078,000 in 1902, or, stated in cubical contents:—

	1904.	1903.	1902.
Sawn woods	109,296 P.s.h.	116,496	128,386
Prepared boards	38,542 P.s.h.	40,755	43,572
Timber	53,822 loads	57,550	62,473

Dock Deliveries for September.

The deliveries for September were:—

	Pieces.
Foreign deals and ends	282,000
Do batters	459,000
Do. boards, rough	452,000
Do. do. prepared	1,179,000
Colonial pine, deals and batters	79,000
Do. spruce do. do.	94,000

A total of 2,545,000 pieces as against 2,825,000 in September, 1903, and 3,284,000 in September, 1902, or, in cubical contents:—

	Sept. 1904.	Sept. 1903.	Sept. 1902.
Sawn wood	10,780 P.s.h.	11,726	13,159
Prepared boards	3,735 do.	4,203	4,828
Timber	5,323 do.	5,552	6,511

Deliveries to Craft.

Deliveries direct from ship to craft for the first nine months of the year were:—

	1904.	1903.	1902.
Deals and batters	84,963 P.s.h.	88,850	87,907
Boards	15,056 do.	19,087	18,648

And for September:—

	1904.	1903.	1902.
Deals and batters	10,528 P.s.h.	13,486	14,516
Boards	1,491 do.	2,896	1,783

Soft Woods.

Messrs. Churchill & Sim state that an unusually small importation from Sweden of batters and floorings during the month has hardly had any effect except to make

buyers anticipate the future more cheerfully. There has been no rise in prices during the month, only an inclination to secure batters and floorings at August levels. The demand for deals is not apparent at present, attention being directed preferably to Russian stocks, which are still judged to be better value at the low prices current for them. Prepared boards are in good demand, but no higher in prices at present.

From Norway the importation has been on about the same scale as in September, 1903, and prices have been about stationary, with, if anything, a slight fall in the value of some dimensions which have been shipped too freely.

From Russia the supply has been about an average one, and more attention has been paid by buyers to Russian shipments owing to the very low prices which have been accepted by shippers in preference to overwintering their stocks. A fair demand has shown itself at the reduced figures, and in some cases prices have even shown an improvement. This is only the case for parcels of reliable quality piled under cover, buyers showing little interest in inferior shipments.

The importation of Finnish batters in September has been on a small scale following the large August supply. Scantlings, both in red and white wood, have maintained their prices, the former especially. The demand for these scantlings continues to grow to the exclusion of the larger sizes,

even though these latter can now be purchased comparatively cheaply.

From Prussia the supply of fir timber has again been infinitesimal, and a glance at the available stock in London at present shows that this wood cannot compete in price or specification with sawn pitch-pine timber. In the smaller-sized balks a little movement is discernible, and prices have moved up a point or two during the month.

From Canada pine and spruce deals have again been imported sparingly in September: the high prices of the better qualities of pine deals have reduced the demand, though the stock of really reliable deals is quite small. The lower qualities have been a dragging market, with perhaps some slight improvement in the demand here and there, but the stock of these is ample at present. Spruce deals have been more neglected during the month, owing to the very low prices ruling for Riga whitewood, and values have eased for stock now here, although it cannot be replaced except at some considerable improvement in prices. The supply from the lower ports has been small, but here again the competition of cheap Russian whitewood is severely felt. Birch planks have been enquired for at full prices, but the demand is of a retail nature. The small supply of sawn timber coming to hand during the month met with a fair demand, and the improvement in prices noticed in August has been maintained in spite of large clearance sales of stock—some of doubtful quality. Prices for good specifications are quite firm, but the supply of this wood always seems ample for every possible call made upon it. Deals have been selling slowly, and the stock in the docks is reducing somewhat.

Hardwoods.

Teak.—Messrs. Denny, Mott & Dickson, Ltd., report that business in teak has been quite insignificant in respect to actual consumption, but increasing prices have had to be paid for such sales as were made. Stocks continue to shrink and shippers remain confident of marketing their small supplies in India at rates which merchants and dealers on this side dare only face up to when they have actual forward orders for consumption in hand. Modest supplies from Bangkok may be expected during next year; but the market for Burmah wood promises to remain in so abnormal a position respecting supplies that any demand for Rangoon and Moulmein timber will have to be specially arranged for shipment as it arises, the stocks of these descriptions in Europe being entirely inadequate to supply even the usual demand for Naval purposes.

Mahogany.—Messrs. C. Leary & Co. state that the position as last reported has not changed; Messrs. Denny, Mott & Dickson, Ltd., think the demand was fair for so dull a month, and, in face of the small importation, prices were well maintained for all descriptions, although Cuba wood remains a weak feature in the market.

Oak.—Odessa oak has found increasing favour; the likely forward supplies for each year's importation have already been largely placed with consumers, and the light quantity of the likely output left for sale has caused an advance in price. But the present rates still show an advantage in price to consumers over Austrian descriptions, which, however, may be put as having equal but not better claims than the Odessa production for high-class constructive work. Prussian oak timber has been in fair demand and the stock is small. The present stock of American quartered oak is more than ample and values are low. There is no change to report in the position of Canadian hardwoods.

American Whitewood.—Although arrivals of lumber have fallen off, and the outlook is better, the present heavy stock must be considerably reduced before values improve.



THE ERECTION OF THE NEW SESSIONS HOUSE.

TESTS ON REINFORCED CONCRETE BEAMS.*

By Prof. E. E. TURNEAURE.

DURING the year 1902-03 a series of experiments on reinforced concrete beams were made in the laboratory of the University of Wisconsin, the most important result obtained from which related to the early appearance of cracks in the concrete. To verify these results, and to carry on studies in other directions, a second series of tests was made under my direction.

It has not been possible to work up the data of these tests completely for this paper, but it has been thought worth while to present the results so far as they concern (1) the early cracking of the concrete, (2) the position of the neutral axis at different stages of the test, and (3) general results as

ture, all ingredients being proportioned by weight. Vulcanite cement was used, good coarse sand, and a crushed limestone of 3/4 in. size and smaller, the very fine dust being screened out. Enough water was used to make the mass easily put in place with a very small amount of tamping. All these beams were 6 ins. by 6 ins. in section and about 64 ins. long (span length, 60 ins.). The rods were spaced from 3/4 in. to 1 in. from the bottom. Where bent rods were used the bend occurred 10 ins. from the centre, beyond which point the rod was carried up to within 3/4 in. from the top of the beam at the support. Stirrups were made of 1/8 in. round rods and spaced in pairs 3 ins. apart, except at the centre, where for a distance of 12 ins. no stirrups were used.

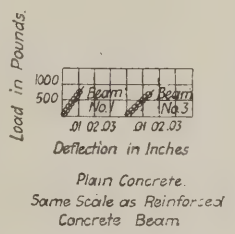
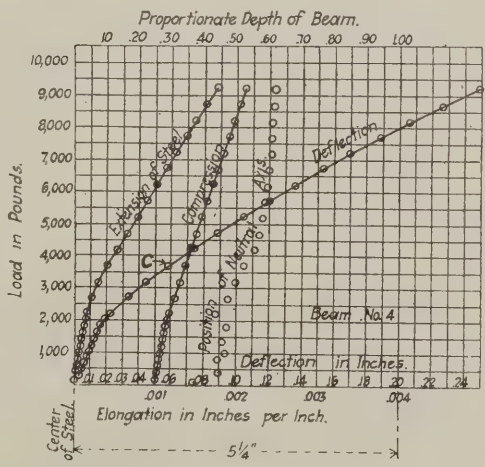
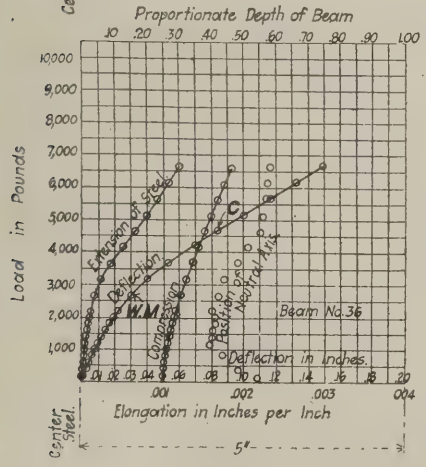
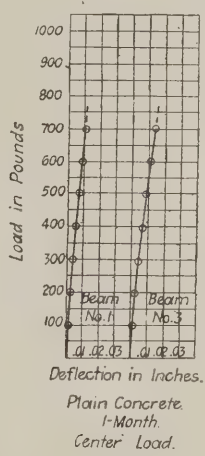
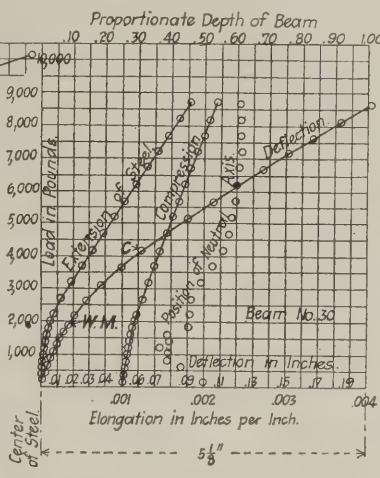
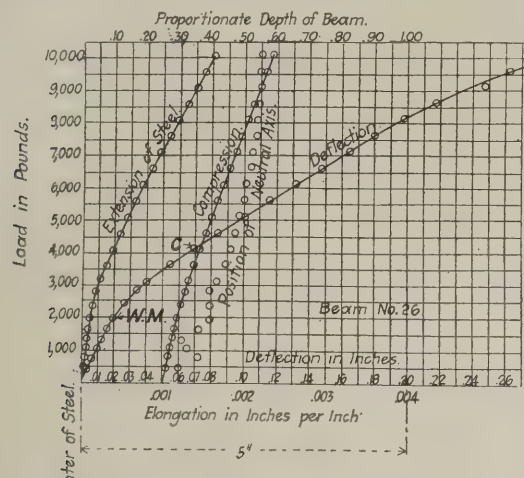
All beams were left in the moulds for forty-eight hours, during which time they were covered with wet cloths. After being

TABLE 2.—TENSION TESTS OF STEEL.				
Kind of rod.	Normal size, in.	Elastic limit, lbs.	Ultimate strength, lbs.	Elongation, per cent.
Plain round	-	75,000	105,000	19.4
Thacher	-	75,000	93,000	17.0
Johnson	-	45,000	62,000	16.2
Ransome	-	59,000	92,500	18.7
	1/8	73,000	88,500	10.0

Apparatus and Methods of Testing.

About one-half of the beams were tested with a centre load and one-half with two equal concentrated loads placed at the third points, thus giving a uniform bending moment over a length of 20 ins. The beams tested by the first method were one-month beams (see diagrams on this page); those tested by the other methods were three-month beams (see diagrams on next page). All were tested with the tension side uppermost so that observations for cracks could be readily made.

In both series the central deflection was carefully observed by micrometer measure-



RESULTS OF ONE-MONTH TESTS OF PLAIN AND REINFORCED CONCRETE BEAMS, UNIVERSITY OF WISCONSIN.

to strength of beams reinforced by different methods and loaded in different ways.

Description of Test Beams.
The following table gives a comprehensive statement of the character of the principal test beams:—

The concrete, as noted, was a 1:2:4 mix-
TABLE 1.—ALL BEAMS OF 1:2:4 CONCRETE, 6 INS. BY 6 INS. BY 60 INS.

No. of beam.	Kind of rods.	Size, in.	No. of reinforcing rods.	Method	Reinf. p.cent.
1-4	No rods	-	-	-	0.0
5-8	Plain round	-	4	Straight	1.07
9-12	"	-	2	Straight	0.97
13-16	"	-	4	2 straight and 2 bent up.	1.07
17-20	"	-	4	All straight with stirrups.	1.07
21-24	"	-	4	2 straight and 2 bent, with stirrups.	1.07
25-28	Johnson	3/8	2	Straight	0.89
29-32	Ransome	1/2	2	Straight	0.98
33-36	Thacher	3/8	2	Straight	0.97
37-40	Plain round	-	4	All straight with stirrups.	1.07

* A paper read before the American Society for Testing Materials.

removed from the moulds they were stored in running water at a temperature of about 60 degs. Fahr. until about four hours before testing. The particular object of this was to enable minute cracks to be more readily detected, in accordance with our experience of the previous year.

Compressive Strength of Concrete.

Compressive tests were made of cubes of each batch of concrete used: 3 in. cubes were tested generally and additional 4 in. cubes in some cases. The results as to strength are given in table 3 and 4 (see next page). The measurements of distortion proved very unsatisfactory, so no values of the modulus of elasticity are given.

Tests of the Steel Used.

Table 2 gives results of tensile tests on the different kinds of steel used. The elastic limit was determined by the "drop of the beam," checked by the use of dividers on the test specimen. A plain bar was purposely selected of a very high elastic limit.

ments on both sides of the beam. In the second series measurements were also made of longitudinal deformations at top and bottom over a length of 14 ins. The apparatus for the latter purpose was specially constructed. It consists of two sets of frames clamped against the sides of the beam, one set carrying four graduated dials with pivoted pointers. Very fine copper wires are made fast to posts on the other frames and led over small pulleys attached to the pointers. Small weights serve to keep the wires taut and to furnish the necessary friction to operate the pointers. The dials are graduated to read 0.001 in. directly and 0.0002 in. by estimation. Distortions are thus measured on four lines. This apparatus proved very satisfactory and was entirely reliable.

Careful observations for cracks were made, and our experience of the previous year enabled them to be detected at a very early stage. It had been found by testing the

beams when somewhat moist a crack is made visible when exceedingly small, it appearing first as a narrow, wet streak perhaps $\frac{1}{16}$ in. wide, and a little later as a dark hair-like crack. It was not necessary to search for the lines with a microscope, as under these conditions they were readily found.

That the wet streak, called a "water-mark" hereafter, shows the presence of an actual crack, was demonstrated last year by sawing out a strip of the concrete containing such a crack. The strip fell apart at the water-mark.

Results of the Tests.

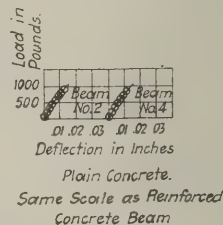
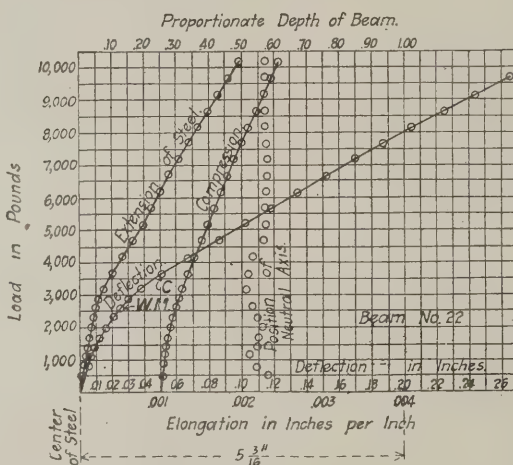
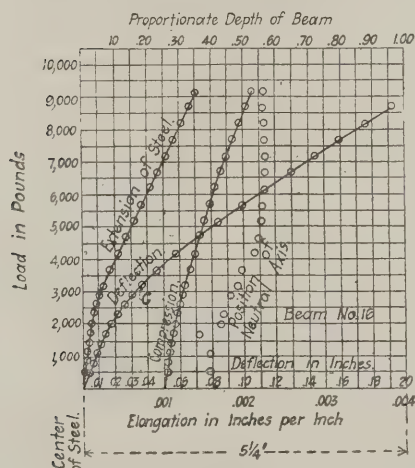
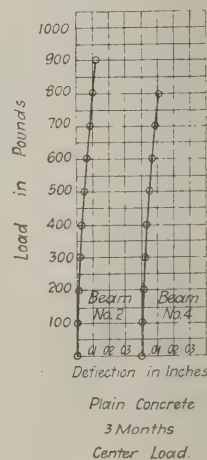
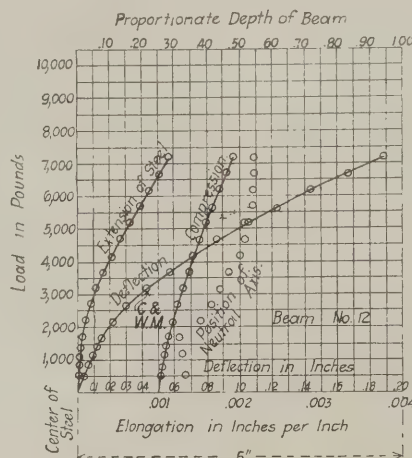
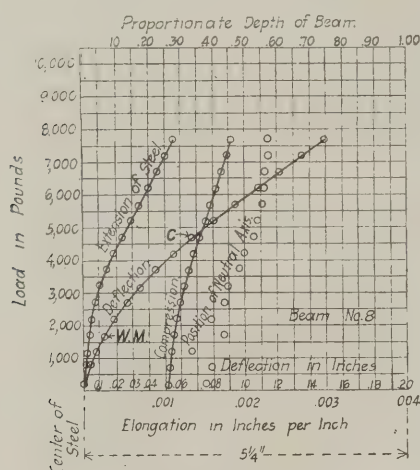
Tables 3 and 4 and the several diagrams give the principal results of the tests. In table 3 are given the loads at rupture and the observed extensions of the extreme fibre of the concrete at the appearance of the first water-mark, and also at the time when the first crack became plainly visible as a crack.

the neutral axis to be in the centre of the beam at this stage of the test. In the diagrams are plotted the deflections, the proportionate extension of the steel and compression of the extreme compressive fibre, and the deduced position of the neutral axis, assuming plane sections, for one beam of each kind tested. The appearance of the first water-mark and of the first crack is also noted on the deflection curves.

It will be noted from these tables that the elongation of the concrete at the time of the first visible crack is in many cases as small as 0.00035, which is considerably less than that given by previous observers. And if we take the water-mark as indicating the presence of a crack not yet visible, the elongation of the concrete is seen to be usually between 0.00010 and 0.00020. The calculated elongations of table 4 are subject to some uncertainty, but for the early stages of the

closely with the observed values up to an elongation of about 0.0003. Above this the calculated values become too small, owing to the change in position of the neutral axis. In general the first water-mark of table 4 was more carefully observed than in the tests of table 3, as the extension apparatus interfered somewhat in the latter case. In the plain concrete no water-marks or cracks were observed before rupture. Comparing the observed and calculated elongation of the reinforced concrete with those for the plain concrete at rupture, it will be seen that the initial cracking in the former occurs at an elongation practically the same as in the latter. It will also be noted on the diagrams that the initial cracking as shown by the water-marks usually begins about where the curves begin to change direction rapidly.

The significance of these minute cracks is an open question. It has been supposed that



RESULTS OF THREE-MONTH TESTS OF PLAIN AND REINFORCED CONCRETE BEAMS, UNIVERSITY OF WISCONSIN.

The compressive strength of the concrete is given as determined from the average of the tests. In table 4 is given the same information, except that the extensions are here calculated from the deflections, assuming the form of curve of the beam to be the same as in the usual theory of flexure and

test they cannot be far wrong. A similar method of calculation applied to the three-month beams gives results agreeing very

TABLE 4.—ONE-MONTH BEAMS (CENTRE LOADS.)

No. of beam.	Load at rupture, lbs.	Proportionate extensions as measured—	Compressive strength of concrete, lbs.	No. of beam.	Load at rupture, lbs.	Proportionate elongation as calculated—	Compressive strength of concrete, lbs.
		At first water-mark.				At first water-mark.	
		At first crack.				At first crack.	
8 P.	7,700	0.00011	4,250	28 J.	7,700	0.00015	3,500
12 P.	7,700	0.00034	2,500	29 R.	8,125	0.00019	2,000
10 P.	7,900	0.00024		31 R.	7,880	0.00012	
14 P.	10,200	—	2,800	35 T.	5,000	0.00013	3,750
16 P.	10,200	0.00025	2,775	39 P.	8,250	0.00023	2,740
22 P.	9,200	0.00018		37 P.	6,700	0.00010	
24 P.	10,200	0.00016	3,000				
26 J.	7,700	0.00013					
30 R.	9,700	0.00012	2,600				
32 R.	9,360	0.00028					
36 T.	7,400	0.00025	3,850				
34 T.	7,300	—					
38 P.	13,100	—	3,850				
40 P.	9,580	—					

*Three months' old.

concrete reinforced by steel will elongate about ten times as much before rupture as plain concrete. These experiments show very clearly that rupture begins at an elongation about the same in both cases. In the plain concrete total failure ensues at once; in the reinforced concrete rupture occurs gradually, and many small cracks may develop so that the total elongation at final rupture will be greater than in the plain concrete. In other words, the steel develops the full extensibility of a non-homogeneous material that otherwise would have an extension corresponding to the weakest section.

The presence of these cracks of course seriously affects the tensile strength of the concrete, and as they appear at an elongation corresponding to a stress in the steel of 5,000 lbs. per sq. in. or less it would seem that no allowance should be made for the tensile resistance of the concrete. Furthermore, if such cracks are present the calculation of the tensile resistance of reinforced concrete by the method used by Considere leads to no

useful result. In his tests Considere determines the stress in the steel from measurements of its elongation and then assumes the concrete to carry the remainder of the load. Assuming the value of ϵ to be uninfluenced by the concrete, this would be correct so long as the stress in the steel and in the concrete was uniform between points of measurement. As stated by Considere himself, such results are only average values. But the concrete may be cracked entirely through and yet possess a very considerable average tensile strength over a length of several inches. Obviously in that case an average is of no value; the strength of the concrete is really zero.

In practical design the most important question which arises is how far a concrete may be cracked without exposing the steel to corrosive influences. In this respect it seems to me that the minute cracks which appear in the early stages of the tests can have very little influence. However, the entire question of the effect of cracks and pores in the concrete on the corrosion of the steel needs careful investigation.

The Position of the Neutral Axis.

The diagrams show the neutral axis to lie at first very near the centre of the concrete beam. As the cracks develop it moves gradually nearer to the compression side. It should be stated that the neutral axis as here found, by measuring deformations over a length of 14 ins., is the average neutral axis over this distance. Where a crack exists, elongation per inch of the steel is more than elsewhere, and the neutral axis is therefore nearer the compression side than is the average position.

Ultimate Strength of the Beams.

In table 5 are given the ultimate moments of resistance of the beams and the resulting stress on the steel as determined by calculation. In this calculation the centre of pressure of the concrete is assumed to be five-eighths of the distance from the observed neutral axis to the outside surface, corresponding to a parabolic variation of compressive stress. (The assumption of a straight-line variation would change the calculated values only about 2 per cent.) The average of the two results for the one-month beams is given first in each group, and that for the three-month beams just below. These calculations indicate that the full elastic limit strength of the Johnson and the Thacher bars was developed, and probably of one or more of the Ransome bars, but that in the other cases failure occurred before the elastic limit was reached.

TABLE 5.—MOMENTS OF RESISTANCE OF BEAMS.

Beam.	Actual moment of resistance, in.-lb.	Area of steel, sq. in.	Calculated stress in steel, lbs. per sq. in.
5'7"	104,000	0.385	61,000
8"	77,000		46,000
9'11"	79,000	0.35	52,000
10'12"	78,000		52,000
13'15"	103,000	0.385	61,000
14'16"	104,000		61,000
21'23"	88,000	0.385	52,000
22'24"	97,000		57,000
25'27" J.	96,000	0.32	70,000
26'28" J.	95,000		70,000
29'31" R.	120,000	0.35	78,000
30'32" R.	95,000		62,000
33'35" T.	77,000	0.35	52,000
34'36" T.	74,000		50,000
37'39" P.	112,000	0.385	65,000
38'40" P.	113,000		65,000

The stresses in the bars as here calculated, which cannot be greatly in error, will be seen to be in nearly every case much higher than would be deduced from the observed elongations of the steel as given in the diagrams, using the usual modulus of elasticity. Thus in the case of beam 12 the elongation at rupture was 0.00115. Assuming a value of ϵ of 29,000,000 lbs. the stress would be 33,000 lbs. per sq. in., whereas the calculations from the actual moment give a stress of 53,000 lbs. The discrepancy is doubtless due partly to the fact that the calculations from the elongations cannot give the maxi-

mum stress on the rods, but it is impossible that all of the difference can be accounted for in this way. There must have been a large initial tension in the rods which of course would not be indicated by the extensometer readings. As the beams were hardened in water such initial tension is very probable.

In but a few cases was the failure free from the influence of shearing stresses, the rupture usually occurring outside the load and on a diagonal line. In a few cases after the cracks had opened up well the concrete failed in compression. The maximum compressive stress in the concrete, calculated on the assumption of a parabolic law, ranged from 2,100 lbs. per sq. in. for the weakest beam to 3,000 lbs. per sq. in. for the strongest. No trouble was experienced from the slipping of the rods, except in one case where they had become displaced in the moulding.

Keystones.

A Furniture Sale is being held for several weeks at Messrs. Oetzmann & Co.'s premises, 62-79, Hampstead Road.

A Bronze Statue of Milton has been executed by Mr. Horace Mountford for erection outside the church of St. Giles, Cripplegate. The pedestal was designed by Mr. E. A. Rickards.

The new Victoria Hall and Music Galleries at Leicester have been erected from designs by Mr. E. Burgess at a cost of £30,000. The building will be entirely devoted to the promotion of music in the Midlands.

His Majesty's Theatre, Aberdeen, is to be erected from designs by Mr. Frank Matcham. Messrs. Brown & Watt are the local architects. The estimated cost is £35,000 and the accommodation to be provided 2,500.

A Russian Panel.—A large ikon 15 ft. 10 ins. by 11 ft. 9 ins. has been executed by Messrs. Doulton & Co. to the order of Mr. Robert Meltzer, court architect, for the Orthopaedic Hospital now being erected in St. Petersburg. It is to be built into the outside front wall, and is in a hard-fired material to resist the extreme cold.

A Discovery.—During excavations by Corporation workmen at Newcastle-under-Lyme the foundation of part of the castle, built about 1180, was discovered last week in an excellent state of preservation. The wall is of local red sandstone. The castle was a residence of several early kings, and John o'Gaunt lived there for many years.

Embankment Trams Again.—The Court of Common Council has instructed the Highways Committee to consider and report to them in reference to the promotion in the next session of Parliament of a scheme for joining the two tramway termini at Blackfriars Bridge and Westminster Bridge by means of a tramway constructed across the two bridges and along the Embankment.

Camphor Wood-paving is to be tried in Buckingham Palace Road, which is to be repaved by the London, Brighton and South Coast Railway in connection with the enlargement of Victoria Station. If within four years the new paving proves unsatisfactory it is to be replaced by creosoted deal. The wood has never before been used for the purpose. Just now the paving opposite the Carlton Hotel is being carefully watched. When it was laid about eighteen months ago four different kinds of woods were used—boxwood, blackbutt, tallow-wood and algaroba. The first three were gifts from the New South Wales Government and the last from the Government of Brazil. The presence of these four kinds of wood explains the figures which are let into the kerb opposite the Carlton. All four are just beginning to show signs of wear, though as yet it is too early to decide which is the most satisfactory.

Lyons's "Popular" Café in Piccadilly, opened on Monday, has a separate kitchen service on each floor.

To develop the Hull Fruit Trade the City Council decided last Thursday to build a new wharf, improve the entrance to the harbour, and construct a new loading pontoon, at an estimated cost of £140,000.

Ulster Society of Architects.—At a special general meeting held at Belfast on October 4th (Mr. W. J. Gilliland, president, in the chair) it was decided to form a class for students of the Society in preparation for the examination of the R.I.B.A. Mr. Charles E. Varndell, A.R.I.B.A., will undertake the supervision of the class.

Proposal to Acquire "Bedlam."—At last week's meeting of the Court of Common Council it was referred to the Parks and Open Spaces Committee to consider and report as to the acquisition of Bethlehem Hospital and grounds for a park or open space, and whether, as it is the property of the Bridge House Estates of the City Corporation, it can be acquired by means of an exchange of other land in or outside the county, or by any other suitable method.

At the new City Hospitals in Leeds (some particulars of which were given on p. 185 of our issue for last week) one of the special features is the system of heating and the hot-water supply. Exhaust steam—which costs nothing and would otherwise be wasted—is utilized for these purposes, being supplied from a central plant at Seacroft. This work was designed and carried out by Messrs. Dargue, Griffiths & Co., Ltd., of London and Liverpool.

The Avenue des Champs-Élysées is to be extended as far as the forest of St. Germain. Its total length will then be about 8 miles, with a width of 45 yds. The centre will be taken up by an electric railway, which will be a continuation of the Paris Metropolitan, and on either side will be tracks for motor cars, cycles, horse vehicles and pedestrians. The total cost of this undertaking, including the bridges which it will be necessary to construct across the Seine, is expected to be about £400,000.

The new County Buildings at Edinburgh, which have been erected at a cost of £40,000 on the old site lying between Parliament Square and George IV. Bridge, take the place of the building (copied from the Erechtheum) which was erected in 1817 from designs by Mr. Andrew Elliot, a well-known architect of his day. The architect of the new building is Mr. James McIntyre Henry, F.R.I.B.A., of Edinburgh. The sculptor-work has been designed and executed by Mr. W. Birnie Rhind, A.R.S.A.

New Organ-Case and Panelling at St. Paul's School.—Two important additions to the beautiful decorations of the large hall of St. Paul's School have recently been completed. The organ, erected by subscription in memory of the late Professor Jowett, has been enclosed in a new case of oak, and oak panelling has been substituted for the original pitch-pine boarding around the walls and in the gallery. The cost of the organ-case has been £460 and of the oak panelling £1,400. The latter was designed and executed by Messrs. Gillow & Co.

A new School at Glasgow.—Quarry Brae Public School, Glasgow, has just been opened. The building is of red sandstone and provides accommodation for 1,476 scholars. The heating and ventilation are on the "plenum" system, a current of warm purified air being delivered into each classroom at a height of 7 ft. from the floor, and withdrawn at floor level. The architects were Messrs. Macwhannell & Rogerson, of Glasgow, and the measuring work was done by Mr. John H. Allan. Including the site, the total cost has been about £28,600.

A new Wesleyan Chapel at Longwood, Huddersfield, has been erected at a cost of £8,000, Mr. Joseph Berry, of Huddersfield, being the architect.

Scarborough's Sea Wall is now completed. It is 4,200ft. long and has cost £127,700. The Marine Drive, 40ft. wide, will now be finished without trouble.

The late Mr. H. A. Hunt, F.S.I., who died on September 26th at the age of sixty-eight years, was head of the firm of Hunt & Steward, surveyors, of Westminster.

The City Surveyorship, rendered vacant by the retirement of Mr. Andrew Murray, will carry a salary of £1,000 a year, rising to £1,500. Candidates are to be not older than fifty. Five will be chosen by a committee for the final selection of the City Corporation.

At the Stanley Hospital, Liverpool, a modern operating theatre has been erected by Messrs. Joshua Henshaw & Sons. The walls and ceiling are finished in Parian cement on a Portland-cement ground, and are painted with Calley's Torbay paint. The basins and sinks have been specially made by Messrs. Twyford & Shanks, and are fitted with knee-action taps. The floor is terrazzo. Heating is on the low-pressure system. Ventilation is by direct inlets and a large extract shaft, the latter worked by an electric fan. In addition to this new theatre the out-patient department has been extended, for which Messrs. James Tomkinson & Co., were the contractors, Mr. Alfred Culshaw being the architect for both buildings.

The Hall at Luton for Mr. Chamberlain's Meeting was erected by Messrs. M'Tear & Co., Ltd., of Belfast. It had three roofs, each 200ft. long by 45ft. span, the total roof area being 30,000 sq. ft. and the total glass area 5,000 sq. ft. Each roof had twenty-three wooden lattice-girder principals, 46½ft. long, constructed on the bow-and-string principle. There were 2,000 lin. ft. of ventilating louvres. The felting used was covered with Lough Neagh sand. When the order was received, the pitch-pine timber for the principals was afloat in the ponds, but in ten full days and two half days the entire sixty-nine principals were shipped. The roofs themselves were erected and completely finished for the inspection of the architects (Messrs. Martin & Martin, of Birmingham) in nineteen working days, three of which were lost by heavy rain.

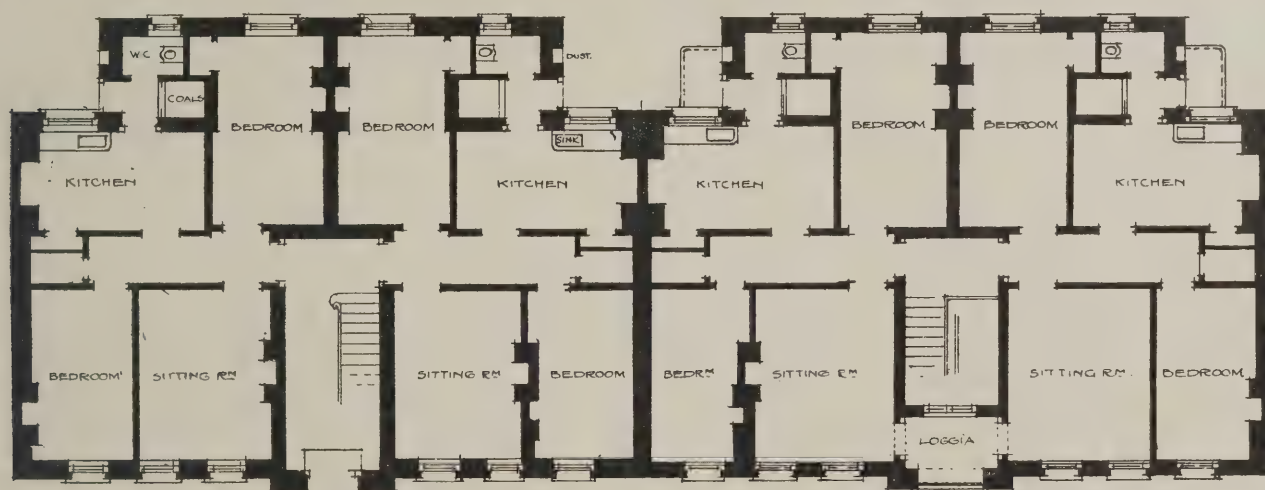
Construction Notes.

Lamination of Tiles.

THE important question of the making of red roofing tiles free from lamination is at last agitating the tile manufacturers of this country. They have for long studied only the question of economy, and ignored efficiency. Architects, builders and other users have been ignorant of the process of manufacture, and have not known how to judge a tile as to its weathering qualities, while they have insisted upon cheapness. Competition naturally has led the manufacturers to economize in every direction. What we blame the manufacturers for, however, is that they have allowed the consumer to go unheedingly on without warning him of danger, not explaining the process of manufacture, for reasons of trade secrecy or indifference. So, after seeing the effects of several years' weathering, architects and others have become nervous, crying out that something is wrong, and have preferred to return to the safe policy of using slates. The tile manufacturers have now awakened to a sense of their duty. At the half-yearly conference of the National Association of Slate Merchants

and Slaters, held at Douglas, on the motion of Mr. J. B. Johnson, of Liverpool, a committee was appointed "to consider and report upon the lamination or flaking in machine-made roofing tiles, as to its effects, cause and remedy (if any proposed)." Considerable discussion took place, and the "Slate Trade Gazette" (the official organ of the National Association) has published in its issues for August and September a number of interesting views from manufacturers. There seems to be a great diversity of opinion as to the cause of lamination and the remedy, although these were stated two years ago in the "Tiler" section of "Specification No. 6," which no doubt is responsible for much of the dissatisfaction among architects the manufacturers complain of. We will again endeavour to dispel some of the ignorance that exists among both tile manufacturers and users. This we can best do by tracing the history of the manufacture of a tile. Firstly, there is the question of the clay, secondly its preparation, thirdly its moulding, and lastly its burning. As regards the raw material there are several kinds of clays: (1) the *Kaolin* clays, which are white, generally crystallized, refractory and undergo no contraction in firing; (2) the *refractory* clays, which are yellowish or greyish white, soft and greasy to the touch, forming with water a tenacious, dough-like and supple paste; (3) the *figuline* clays or *potter's earths*, which are plastic and coloured, generally becoming red in baking, and much more fusible than the preceding, most of them containing a little limestone, not exceeding 2 or 3 per cent.; (4) the *clayey marls* or *effervescent* clays, which are of variable plasticity, very fusible, and contain a considerable quantity of limestone, which effervesces if treated with acid (according to the amount of limestone, they are called *clay marls* or *calcareous marls*); (5) *lehm*, *tableland* *slime* or *brick-earth*, which is a mixture of clay and very fine quartz, coloured yellow or red by oxides of iron (when calcareous, lehm is named *loess*); (6) *smectic* clay, or *fuller's earth*, not used for pottery; and (7) *ochreous* or *ferruginous* clays, used as colouring matters and not for pottery. The fourth and fifth varieties are used in tile-making. The most refractory clays are those which are nearly pure silicate of alumina; the presence of metallic oxides, such as oxides of iron, lime, potash, soda, &c., makes clays fusible, by reason of the formation at high temperatures of complex silicates, which are all more or less fusible. The carbonate of lime or limestone, though refractory itself when pure, renders the clay fusible if mixed with it. The oxides of iron which colour clays with various tints make them fusible by reason of formation during burning of silicates of iron. It is the above-mentioned practice of adding lime to increase fusibility, or the use of clays containing a considerable proportion of limestone, which is largely responsible for the lamination of tiles, because the specks of lime become slaked by moisture and split the tiles. This may be remedied by hard firing so as to unite the lime with the silica and alumina, but then the colour becomes deeper, perhaps producing (as in the case of Broseley tiles) purple instead of the red desired. "Limewash" is the technical name for this defect in a clay. There should not be more than 10 per cent. of limestone in any clay. Rich clays cannot be used alone on account of their eminently plastic properties; they stick too much to the moulds or cylinders of machines, and the paste they form with water falls in and loses shape after working, while the very tenacity of rich clays prevents equal drying in all parts of the mass; hence cracks form. To thin them sufficiently, antiplastics are used, such as sand, chalk, clay, marls, and in general thin clays, cinders, coke-dust, sawdust, &c. Secondly, as regards the preparation of the

clay. It is very seldom that a clay can be used without admixture with other substances. It was formerly the practice to spread the clay in heaps and leave it throughout the winter to weather, by which process the mass was disintegrated so as to be easily made homogeneous, but this has now been generally superseded by machinery, which performs the work better and quicker. Several manufacturers suggest that this elimination of weathering is one of the causes of defects in tiles, but it can only be so when the clay contains substances which undergo decomposition on exposure to the atmosphere, such as iron pyrites. The clay having been mixed, and any stones removed by machinery, washing or other means—though some clays do not need this—is taken to the crushing mills, which reduce hard bodies, such as limestone or flint, found in it. The clay may be moistened to enable it to be worked easily, but this is avoided if possible, as it is more easily handled, while in the drying of the moulded tiles not so much contraction has to be reckoned with, and fuel is economized. Plastic and fusible clays undergo much contraction: the former because they contain a great deal of water, and suffer the greatest shrinkage at the moment they lose the water, say, about 110 degs. C., but a higher temperature causes little contraction because the fusible particles cannot get closer together. Fusible clays, on the other hand, undergo shrinkage in the firing because the particles weaken and approach one another to form a homogeneous mass. This contraction is one of the great difficulties to be overcome: it causes warping and cracking, and as dry clays are free from this defect the desire of modern manufacturers to work the clay dry is very easily understood, but the objections to this will appear in what follows. The clay and other admixed ingredients are blended and rendered homogeneous in the pugmill and moulding machine. This may be performed by knives or rolling cylinders, fluted or plain, the latter being mostly used. The tiles may be moulded by compression or expression. The latter is the easier and is usually adopted for roofing tiles. The moulding is done by pressing the clay by means of screws or cylinders through orifices or dies. These dies are movable and can be easily changed to make bricks or tiles of any dimension and shape. Now it is just at this part of the process of manufacture that the lamination occurs. The friction of the clay on the sides of the die slackens the speed of the exterior particles as compared with the inner ones in varying degrees, and causes exfoliation or sliding along planes. This occurs less with rich clays, which glide more easily, but with thin clays special hydraulic dies have to be used in order to overcome the inconvenience. In these dies water lubricates the clay as it passes through. Layers are formed in the same way by the expression cylinders, according to the dryness of the clay. If there is sufficient moisture in the clay, layers tend to draw together and anneal in the drying. The tiles are cut into shape before going to the drying-rooms. Lastly, as regards burning, hard-firing, as stated above, is advantageous with dry clays as it welds the fibres or layers together, but this produces a glassy vitreous surface, often of dark ugly colour. The whole trouble has arisen since tiles began to be machine-made twenty years ago; there is never any trouble with the old hand-made sand-faced tiles; it is true that the latter were heavier than the one-ton per thousand now so foolishly insisted on, but they lasted. Lamination, in short, is to be traced primarily to dry-moulding in order to be able to handle tiles easily and avoid injury by contraction in drying, and secondarily to the use of limewash clays. Architects should be careful about the tiles they use.



GROUND & FIRST FLOOR PLANS

SECOND FLOOR PLAN

"QUEEN ALEXANDRA'S COURT," WIMBLEDON. ERNEST GEORGE AND YEATES, HONORARY ARCHITECTS.

"QUEEN ALEXANDRA'S COURT."

THIS name has been given to the homes for necessitous widows and daughters of officers which are being erected at Wimbledon. The scheme is the outcome of Sir James Gildea's action in starting an officers' branch of the Soldiers' and Sailors' Families Association in 1886, the object of which was to make pecuniary grants to necessitous officers' widows. In 1898 the idea of providing homes for these ladies was conceived by Sir James, and twelve flats on one staircase were rented in Elm Park Mansions; and this proving satisfactory, the site of $3\frac{1}{2}$ acres at Wimbledon was obtained, and building begun. Queen Alexandra subscribed £5,000 from her War Fund to it. The qualifications are that the officer's daughter or widow who occupies one of the flats must be between fifty and eighty years of age, with an income between £40 and £100 a year. They can bring two daughters or nieces or other female relatives to live with them. They will live free of rent and taxes, the only charge being for gas or electric light. Sixty small flats will ultimately be provided, twenty-four of which are now available for occupation. There are to be four blocks of buildings, built on three sides of a quadrangle. The two smaller blocks, now practically finished, each have twelve self-contained flats, while

those that will be finished next June will possess fifteen each. Each flat consists of a sitting-room, two bedrooms and a kitchen. The floors are parquet, walls distempered, and there are good doors, locks and cupboards, with gas stove for cooking, and grates in all the rooms. Messrs. Ernest George & Yeates, as *honorary* architects, supplied the design for the buildings, and Mr. C. E. Lancaster Parkinson has undertaken the direction and supervision of the work.

Law Cases.

Sanitary Inspectors' Mistakes. — At the Southwark County Court last week, Miss Johnson, a property owner, sued the Bermondsey Borough Council for £7 10s., expenses incurred in opening up ground on the order of the Council, and damages for trouble and inconvenience arising out of the alleged negligence of the Council's officials. The plaintiff's case was that she was served with notice to reconstruct the drains of one of her houses. The builder instructed to do the work found that the drain and the smell complained of "existed only in the imagination of the sanitary inspector." There was no drain under the house, it being next door. The mistake had arisen through the houses having been renumbered. — Judge Addison

held that sanitary inspectors by law were the judges of whether drains required relaying or repairing, and if they, by reason of a defective nose or any other cause, made a *bonâ-fide* mistake the borough council could not be held liable. He gave judgment for the defendant council, but without costs. ...

Obituary.

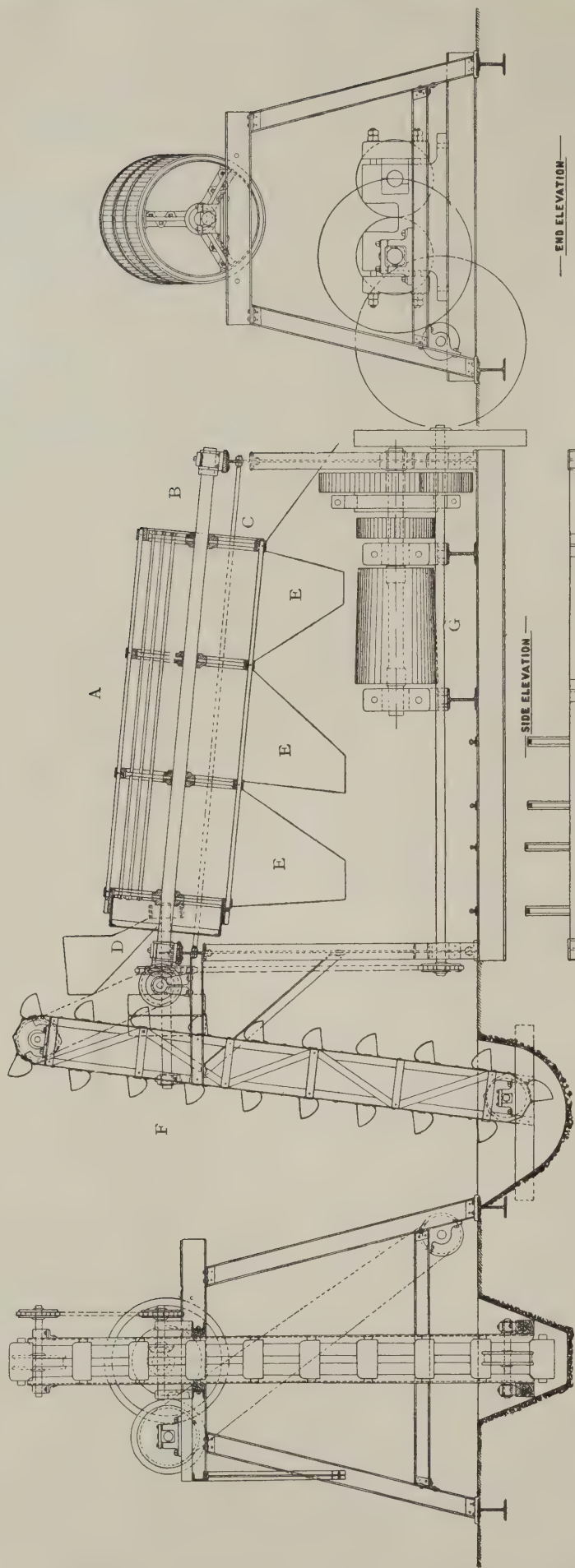
The late Mr. Nathaniel Brookes, builder and contractor, of Patricroft, left estate valued at £4,508.

The late Mr. John Hibbert, builder, of East Manchester, Lancs, left estate of the gross value of £19,468.

Mr. J. Coates, builder, of Rochdale, for many years a member of the Town Council, died recently from heart failure.

The estate of Mr. Joseph Mastin, head of the firm of contractors and builders, of Sheffield, who died on August 27th, has been entered for probate at £15,398.

M. Bartholdi, the celebrated French sculptor, died in Paris on October 4th at the age of seventy-two years. His most famous works are the statue of "Liberty enlightening the World" at the entrance to New York Harbour, and the "Lion of Belfort" in the Place Denfert-Rochereau, Paris.



A, Revolving Screen or Separator.
 B, Longitudinal Bars.
 C, Open End and Delivery to Clay Table.

D, Feed.
 E, Chute for Stones, Gravel, &c.
 F, Endless Chain Elevator.
 G, Grinding Mill.

A NEW SAND, GRAVEL AND CLAY SEPARATOR AND GRINDING MILL FOR BRICKMAKING, BY J. S. WILKES.

BRICKMAKING.

A Machine that utilizes Earth which would otherwise be unworkable.

IN digging clay for brickmaking it frequently happens that a great deal of earth at the top has to be thrown aside as useless because it is mixed with sand and stones, and consequently the excavation has to be carried down till a bed of true clay is reached. Many devices have been tried for dealing with this upper ground or "bearing," but it appears to have been left to Mr. John S. Wilkes, proprietor of the Leamore Brick Works, Birchills, near Walsall, to introduce a machine which is really satisfactory in operation. From the elevations and plan on the opposite page it will be seen to consist essentially of a revolving cylindrical screen into which the material is fed by an elevator working down into the marl hole. The screen is 10ft. long and 3ft. in diameter, and has a number of steel bars spaced at intervals around the circumference, with another series of longitudinal bars inside for the purpose of carrying the material up the sides and allowing it to fall, by which process the gravel, stones and clay are separated. The sand falls through the smaller spaced outer bars and the gravel through the second series of bars, whilst the larger lumps, consisting of clay and stones, go down the screen and are so broken up that the clay "balls" and the stones roll out on to a table at the end;

the stones being picked out by hand and removed to a stone-breaker. During the same operation the stones are cleaned, and such as are too large for gravel and too small for a stone-breaker fall down a chute on to a grinding mill; this latter having steel taper rolls, about 2ft. in diameter, driven by toothed wheels and gearing. It will thus be seen that the apparatus is a very simple one and not likely to get out of order; in fact, we are informed that the machine is working very satisfactorily and is found to be invaluable in dealing with material which formerly had to be cleared away and thrown up in heaps over the brickfield.

Builders' Notes.

A Crane to lift 125 tons.—The Dundee Harbour Trustees are now considering a proposal of the Caledon Shipbuilding and Engineering Company, Ltd., to erect at their own expense (£12,000) a crane to lift 125 tons, provided the trustees will construct a wharf on which to place it.

Federation of Builders' Labourers.—The United Builders' Labourers' Union and the Federated Builders' Labourers of Great Britain and Ireland have combined. A start has been made with a reserve fund of £700, and each union will pay 1s. per year per member to-

wards the maintenance of a disputes fund. The federation as such will not recognize a strike unless at least 200 members are involved.

The Building Trade of Newport (Mon.) seems to be looking up. Plans for the erection of a large number of new houses have been passed, especially for the Corporation Road district.

An Extraordinary Scene occurred last week in the Avenue de la Motte Piquet, Paris, when a gang of fifty-four stonemasons walled up the builder in his office and would not release him until he paid their wages. The builder had refused to pay until the contractor settled accounts with him, whereupon the masons shut him up in the temporary office and quickly built up a brick wall in front of the doorway. The builder's shouts for assistance brought the police on the scene. The masons, however, refused to admit them. Sixty policemen were thereupon summoned, but the masons armed themselves with tools. Seeing that the men were determined and that there was serious danger of bloodshed, the officer withdrew his men, and then another palaver with the builder took place. Eventually the latter agreed to pay the men's wages, and a messenger was sent to the bank for the money. When the cash had been counted out and each man paid, the masons pulled down the wall and released their prisoner, who had been shut up without food from 8 in the morning till 5 in the afternoon.

MODERN LONDON BUILDINGS.

(Continued from p. 169, No. 503.)

N.W. DISTRICT: DOMESTIC BUILDINGS.

BUILDING.	ARCHITECT.	APPROXIMATE COST.	REMARKS.
1879. House for Mr. H. G. Gotto, Gold's Hill	Lansdown & Harris	£4,200	Of brick and stone, with half-timber above.
1880. "Beauchene," Fitzjohn's Avenue, Hampstead	George Lethbridge	—	Of red brick, with Corsehill stone dressings.
1881. Fitzjohn Tower, Hampstead	J. T. Wimperl	—	In red brick, with Portland stone dressings.
1883. "Hillcote," Netherall Terrace, Finchley Road	H. Saxon Snell & Son	2,000	Of red brick, with tile-hung gable and upper storey.
Hyde Park Mansions, Marylebone	C. Eales & Son	—	Of red brick, with dressings of Portland stone.
1884. Oxford and Cambridge Mansions, Marylebone Road	C. Eales & Son	62,000	Red Mansfield stone dressings. Cost 10d. per cub. ft.
1885. "High Close," Holford Road, Hampstead	W. Hay Murray	—	Of red brick, first floor with gables tile-hung.
1885. "Dunellin," New Road, Finchley	H. Saxon Snell & Son	—	General walling of red brick, relieved with moulded brickwork and terra-cotta.
Artizans' Dwellings, Lisson Grove	F. T. Pilkington	—	Accommodation for 250 families. Façades in red brick and moulded concrete.
1888. Artizans' Dwellings, Hampstead	Henry S. Legg	10,600	For Wells and Campden Charity. Four blocks, providing 120 rooms, divided into 65 tenements.
1889. No. 1, Fitzjohn's Avenue, Hampstead	J. J. Stevenson	—	Walling of stock brickwork, with red brick dressings and tiled roofs.
Redington Lodge, Redington Road, Hampstead	Horace Field	—	—
1890. Priory Mansions, Park Road, Kilburn	Richard D. Hansome	—	Each block contains eight suites of flats.
1893. Studio for Mr. Yeend King, "Hley Road	F. J. Lewis	—	Studio 25ft. by 28ft., and glass-house for painting out-door subjects 10ft. square.
1894. Rectory House, Brondesbury	C. R. Baker King	2,100	Faced with picked stocks, dressings of Douling stone, roof of Sedan slates.
St. Katherine's Lodge (additions), Regent's Park	Lee & Pain	—	New wing, with oriel window, Gothic in style.
1895. Artizans' Dwellings, Grove Road, St. John's Wood	A. R. Stenning	250,000	Buildings occupy 4½ acres and accommodate 2,960 persons; 540 sets of rooms in six blocks.
1897. "Callcott Court" Residential Flats, Brondesbury	P. Palgrave & Co.	—	Frontage of 140ft. Georgian in style.
Residential Flats, Shoot Up Hill, Kilburn	P. Palgrave & Co.	12,000	Built on the site of "The Old Noll"; contains sixteen sets of flats.
Residential Mansions, West End Lane	P. Palgrave & Co.	—	Three flats on each floor, with separate main entrances.
St. Saviour's Homes, Hendon	Prothero & Phillpot.	—	Cottages, worked as female penitentiary by Church Army.
1898. Cottage Homes of Linen and woollen Drapers' Institution, Mill Hill.	George Hornblower	—	The scheme provides 54 homes in all.
"Smyrna" Mansions, Smyrna Road, West Hampstead	Palgrave & Co.	—	—
Three Houses, corner of Lyndhurst Road, Hampstead	Horace Field	—	Of red brickwork, with green slates and wooden cornice.
1900. House for Dr. J. W. Edridge, Hendon	George Hornblower	—	Upper part of walls finished with rough-cast; roofs of green slates.
1901. Flats, King's Gardens, Hampstead	Palgrave & Co.	—	380 rooms, divided into fifty self-contained flats.
Seymour and Somerset Buildings, Churchway, St. Pancras	Superintending Architect L.C.C.	—	Accommodates 472 persons in 100 tenements.
Tower Wing, "St. Swithin's," Hendon	George Hornblower	—	Electrical research laboratory on ground floor.

N.E. DISTRICT: DOMESTIC BUILDINGS

1899. Artizans' Dwellings, Britannia Street and Provost Street, Hoxton.	Rowland Plumble	£22,917	Three blocks of five storeys, accommodating 400 persons.
1900. Boundary Street Buildings, Bethnal Green	T. Blashill (23 blocks). Rowland Plumble (2 blocks).	270,000	Accommodation for 5,380 persons in 15 flats of one room, 533 of two rooms, 388 of three rooms, 98 of four rooms, 7 of five rooms and 3 of six rooms; also central laundry, 77 workshops and 18 shops. The area cost £333,000 to acquire.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Oct. 13	Hollingbourne—Repairs to Laundry, &c.	Rural District Council	Isolation Hospital, Hollingbourne.
" 13	Durham—Houses	Co-operative Society, Ltd.	George Ord, Architect, 16 The Avenue, Durham.
" 14	Osmington, near Weymouth—Coastguard Buildings		Superintending Civil Engineer, H.M. Breakwater Works, Portland
" 14	Abergavenny—Free Library Reading-Room		B. J. Francis, Architect, Abergavenny.
" 14	Culloden—Cottages, &c.		G. Gordon & Co., Civil Engineers and Architects, Inverness.
" 15	Meridan, Coventry—Residence, &c.	Guardians	H. W. Chattaway, Trinity Churchyard, Coventry.
" 15	Runcorn—Engine-House	Rural District Council	G. F. Ashton, Clerk, 71 High Street, Runcorn.
" 15	Seven Sisters, Wales—Chapel		J. Cook Rees, Architect, Neath.
" 17	Amersham—Infirmary	Guardians	H. Belch, Architect, Chesham.
" 17	Darlington—Wing, &c. to Neasham Hall	Sir T. Wrightson, Bart., M.P.	G. G. Hoskins, F.R.I.B.A., Architect, Court Chambers, Darlington.
" 17	Portsmouth—Cookery Centre	Education Committee	A. H. Bone, Architect, Cambridge Junction, Portsmouth.
" 17	Wigan—Temporary Hospital	Guardians	J. E. Alcock, Master, Union Workhouse, Frog Lane, Wigan.
" 18	Corkbeg, co. Dublin—Coastguard Station		Office of Carpenter in Charge, Queen's College, Cork.
" 18	London, E.—Additions to Stores' Department	Managers of Poplar and Stepney Sick Asylum.	J. W. Clarkson, 136 High Street, Poplar.
" 18	Merthyr Tydfil—Hospital Ward Pavilions, &c.	Urban District Council	T. F. Harvey, Town Hall, Merthyr.
" 18	Londonderry—Alterations, &c., to Post-Office		H. Williams, Secretary, Office of Public Works, Dublin.
" 18	Chelmsford—Road Pumping Station	Corporation	Town Clerk, 16 London Road, Chelmsford.
" 18	Sunderland—Engine-House	Sunderland and South Shields Water Company.	T. & C. Hawksley, Civil Engineers, 30 Great George Street, Westminster, S.W.
" 18	Birmingham—Enlargement of School	Education Committee	A. Rowse, 3 Newhall Street, Birmingham.
" 19	Pontnewydd, near Newport, Mon.—Alterations, &c., to School.		W. H. Dashedwood Caple, Architect, Church Street Chambers, Cardiff.
" 19	Hampstead—Buildings for Housing Scheme	Borough Council	O. E. Winter, Borough Engineer, Town Hall, Hampstead.
" 21	Cockburnspath, Berwick—Coastguard Buildings		Superintending Engineer, H.M. Naval Establishment, Rosyth, Inver-keithing, N.B.
" 21	Streatham—Sorting Office	Commissioners	Secretary, H.M. Office of Works, &c., Storey's Gate, S.W.
" 22	Aberystwyth—Additions &c., to Workhouse	Guardians	Union Workhouse, Aberystwyth.
" 22	Ince, near Wigan—Alterations, &c. to Council Offices	Urban District Council	A. T. Swain, New Council Offices, Ince Green Lane, Ince.
" 24	Gravesend—Public Library	Town Council	E. J. Bennett, 191 Parrock Street, Gravesend.
" 27	Aldershot—Post-Office	Commissioners	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 27	Farnborough—Post-Office	Commissioners	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 28	Ashford, Kent—Mortuary	Urban District Council	W. Terrill, Surveyor, North Street, Ashford.
" 28	Penytrenglyn, Wales—School	Rhondda U.D.C.	Jacob Rees, Hillside Cottage, Pentre.
" 28	Rhondda—School	Urban District Council	J. Rees, Hillside Cottage, Pentre.
" 31	Wallasey—Public Offices	Urban District Council	H. W. Cook, Public Offices, Egremont, Cheshire
Nov. 1	Troedryhiw, Wales—Renovation of Church		William Tyley, 16 Tydfil Terrace, Troedryhiw.
ENGINEERING:			
Oct. 13	Brighton—Electric Light Installation	Town Council	Hugh Talbot, Town Clerk, Town Hall, Brighton.
" 14	Keith, N.B.—Waterworks	Town Council	L. B. Barclay, Borough Surveyor, Keith.
" 15	Dunbar, N.B.—Water-main	Town Council	Town Clerk, Dunbar.
" 15	Methley, Yorks—Gas-Engines		G. Bernard Hartley, 10 East Parade, Leeds.
" 17	Stockport—Cooking Apparatus	Guardians	W. H. Ward, Architect, Paradise Street, Birmingham.
" 17	Antwerp—Electric Cranes	Municipality of Ghent	Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
" 17	Dublin—Bridge Works	Great Northern Railway Co. (Ireland).	W. H. Mills, Engineer-in-Chief, Amiens Street, Dublin.
" 18	Sunderland—Pipelining	Directors of Sunderland and S. Shields Water Co.	T. & C. Hawksley, 30 Great George Street, Westminster.
" 18	London, S.W.—Electric Lighting	Wandsworth Borough Council	P. W. P. Adams, 28 Victoria Street, Westminster.
" 19	Thornley, Durham—Shaft	Weardale Steel, Coal and Coke Co., Ltd.	Thornley Colliery Office.
" 19	Hornsey—Laundry Machinery	Borough Council	O. E. Winter, Borough Engineer, Town Hall, Hornsey.
" 20	Thurstone, Sheffield—Heating	Building Committee	J. M. Greaves, Townend House, Thurlstone, Penistone.
" 20	Swansea—Boiler	Harbour Trustees	A. O. Schenk, Harbour Offices, Swansea.
" 21	London, N.—Electric Lighting	Tottenham U.D.C.	E. Crowne, Clerk, 712 High Road, Tottenham.
" 22	Bahia, Brazil—Railway		Secretary of Agriculture, Bahia, Brazil.
" 22	London, S.W.—Subway	W. London Extension Co., Ltd.	Engineer, Paddington (G.W.R.) Station.
" 24	Middleton—Boiler	Corporation	Frederick Entwistle, Town Clerk, Middleton.
" 25	Rio de Janeiro—Machinery, &c.	Brazilian Central Railway Co.	Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
Nov. 5	Buxton—Valves, &c.	Urban District Council	G. H. Hill & Sons, Engineers, Albert Chambers, Albert Square, Manchester.
1905.			
March 31	Shanghai—Electric Tramways		Pook & Co., Agents for Municipality of Shanghai, 63 Leadenhall Street, E.C.
IRON AND STEEL:			
Oct. 14	Sheffield—Ironmongery	Education Committee	Education Committee's Office, Sheffield.
" 18	London, E.C.—Iron Wire Fencing	S. Indian Railway Co., Ltd.	Company's Offices, 55 Gracechurch Street, E.C.
" 18	South Shields—Pipes	Directors of Sunderland and South Shields Water Co.	Office of Company, Maritime Buildings, St. Thomas Street, Sunderland.
" 20	London—Iron Indicator Tablets	County Council	Clerk to Council, County Hall, Spring Gardens, S.W.
" 21	Londonderry—Pipes	Committee of Management, District Lunatic Asylum.	M. A. Robinson, C.E., Richmond Street, Londonderry.
Nov. 2	Watford—Pipes	Urban District Council	Engineer, Council Offices, 14 High Street, Watford.
PAINTING AND PLUMBING:			
Oct. 8	Blawart Hill, Glasgow—Plumber and Painting Work	Renfrew and Clydesbank Joint Hospital Board.	Stewart & Patterson, 14 Blythswood Square, Blawart Hill, Glasgow.
" 10	Luton—Painting	Town Council	Borough Surveyor, Town Hall, Luton.
" 11	Styal, near Handforth, Cheshire—Painting	Committee of Cottage Homes	Mr. D. S. Blomfield, Clerk, Union Offices, All Saints, Manchester.
" 17	Carlisle—Painting Works		George D. Oliver, F.R.I.B.A., County Architect, Carlisle.
" 17	Huddersfield—Painting, &c.	Guardians	E. A. Rigby, Clerk, Union Offices, Ramsden Street, Huddersfield.
ROADS AND CARTAGE:			
Oct. 13	Blaina, Mon.—Limestone	Nantyglo and Blaina U.D.C.	J. A. Shepard, Clerk, Town Hall, Tredegar.
" 15	Faversham—Road Metal	Corporation	A. Tassell, Town Clerk, 20 West Street, Faversham.
" 15	Stourbridge—Asphalt Limestone Paving	Urban District Council	F. Woodward, Town Surveyor, Town Hall, Stourbridge.
" 15	Whitley Bay, Northumberland—Road	Whitley and Monkseaton U.D.C.	J. P. Spencer, 30 Howard Street, North Shields.
" 17	Watford—Granite	Urban District Council	Clerk to Council, Town Hall, Watford, Herts.
" 18	New Barnet—Making-up	Urban District Council	Henry York, Surveyor, Council's Offices, Station Road, New Barnet.
" 18	Tottenham—Making-up Roads	Urban District Council	W. H. Prescott, Engineer to Council, Coombes Croft House, 712 High Road, Tottenham.
" 19	Fulham—Making-up Roads	Council	Francis Wood, Borough Surveyor, Town Hall, Fulham.
" 22	Truro—Steam-rolling	Rural District Council	J. Retallack, Surveyor, Ventongimps, Callestick, R.S.O. (for North Division); and J. P. Carbis, Surveyor, Ruan High Lanes, Gram-pound Road, Truro (for South Division).
" 22	Wrotham, Kent—Steam-rolling	Urban District Council	A. J. H. Powell, Surveyor to Council, Borough Green.
" 24	Romford—Granite	Rural District Council	George Lapwood, Highway Surveyor, Victoria Chambers, Romford.
" 26	St. Anne's-on-Sea—Street Works	Urban District Council	The Surveyor, South Drive, St. Anne's-on-Sea, Lancs.
No date	Oswestry—Street, &c.		Shayler & Ridge, Surveyor, Oswestry.
SANITARY:			
Oct. 13	Shotton Colliery, Durham—Sewage Disposal	Easington R.D.C.	D. Balfour & Son, 3 St. Nicholas' Buildings, Newcastle-on-Tyne.
" 13	Hatton, near Tutbury—Sewage Tank	Repton R.D.C.	J. T. H. Richardson, Hatton, near Tutbury Station.
" 17	Douglas, Isle of Man—Lavatories	Harbour Commissioners	Commissioners' Office, Coronation Chambers, Douglas.
" 17	Hendon—Pipe Sewer	Urban District Council	S. S. Grunley, Engineer, Council Offices, Hendon.
" 21	Ashby-de-la-Zouch—Sewers	Rural District Council	S. Turner, Surveyor, Avenue Road, Ashby-de-la-Zouch.
" 24	Larne, Ireland—Sewerage Works	Rural District Council	J. W. Whiteford, Engineer, 28 Waring Street, Belfast.
Nov. 2	Battle, Sussex—Sewers, &c.	Urban District Council	Alfred Dray, Engineer, Town Hall Chambers, Hastings.
" 5	Pontllytyn—Road and Drains		Gustard & Waddington, Solicitors, Tredegar Chambers, Bridge Street Newport, Mon.

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DESIGN FOR LIVERPOOL CATHEDRAL



BY C. A. NICHOLSON.

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THE
BUILDERS' JOURNAL
AND ARCHITECTURAL RECORD.

October 19, 1904. Vol. 20, No 506.

6, Great New Street, Fetter Lane, E.C.

Summary.

In his presidential address to the Manchester Society of Architects Mr. J. W. Beaumont suggested that municipalities should devote space in art galleries to architectural casts and drawings, and building materials. He thought that the site of the old infirmary at Manchester should be left as an open space, and expressed the opinion that cement, painted every two years, was the best material for facing buildings in such thoroughfares as Market Street. (Page 207.)

A large school devoted exclusively to the building trades of London has been established at Brixton. (Page 212.)

Mr. Winder, in his presidential address to the Sheffield Society of Architects and Surveyors last week, said that the provision by corporations of dwellings for the working-classes was totally unnecessary and extravagant. He suggested the erection of one-storey wood and galvanized iron huts for the very poor. He said the Bill for the taxation of ground values would inevitably tend to reduce open spaces in and around towns and cities, and he expressed the opinion that architects and surveyors should support the Bill for introducing the metric system. (Page 207.)

As a rule, when an architect is commissioned to design and fit out the rooms of a ship he has only the barest sketch plans given him by the shipbuilders, and from these he has to evolve his entire scheme. (Page 202.)

A lens for architectural photography should give an angle not wider than 65 degs. One lens will not do everything: therefore Mr. Dockree recommends a "battery" of them: for a whole-plate camera a 6½ in., 9 in. and 12 in. focal lengths, and for a 12 × 10 in 8½ in., 10 in., 13 in. and 16 in. (Page 203.)

At last week's meeting of the Chertsey Rural District Council the medical officer recommended that the by-laws should be altered so as to permit the erection of cottages of iron or wood on brick foundations. (Page 210.)

At the Southwark Police Court last Wednesday Mr. Baggallay dismissed as perfectly preposterous a summons taken out by the Bermondsey Borough Council against a builder for failing to deposit a plan before putting in a pipe and a little gully when repairing drains. (Page 210.)

H.M. the King has given his patronage to the Sanitary Institute. (Page 207.)

The tender of Messrs. Foster & Dicksee for the erection of Long Grove Asylum, amounting to £359,892, has been accepted by the London County Council. (Page 210.)

[A valuable reply to an enquiry about permission to erect temporary buildings in the grounds of London houses will be found on p. 209.

To Associate Technical Instructors.

A VIGOROUS attempt is now being made to form a National Association of teachers of science, art and technology engaged in polytechnics, technical institutes and schools of art, the main objects of the proposed association being—(1) the advancement of technical education, (2) the promotion and safeguarding of the professional interests of such teachers, and (3) to act as a means of communication between "technical" teachers and the various educational authorities and the public. There is an undoubted need for such an association, as teachers of scientific and technical subjects are now without any central organization. The movement is at present confined to London. Preliminary meetings have been held at various polytechnics and technical institutes in the metropolis, an executive committee has been appointed (with Mr. I. Wilson, Battersea Polytechnic, as the honorary secretary *pro tem.*), and a general meeting of teachers is to be held at the Birkbeck College on Saturday, October 22nd, at 3.30 p.m., when Mr. Lineham (head of the Engineering Department at the Goldsmiths' Institute) will occupy the chair. The outcome of it will be watched with interest.

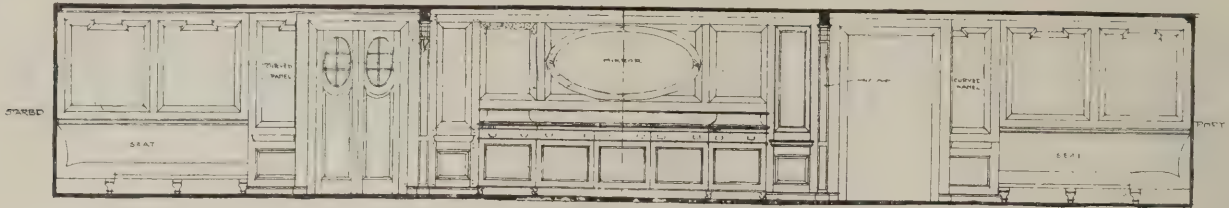
Local Architect or a Competition.

A DISCUSSION on the subject of competitions took place at a recent meeting of the Crewe Town Council. The Education Committee were criticized by Councillor Kinsey for giving the work of enlarging the Broad Street schools to Mr. Bolshaw, a local architect. He contended that all work of this kind should be thrown open to competition, but, despite the fact that the Committee had previously decided in December last to hold competitions in future, they now proposed to give into Mr. Bolshaw's hands the proposed new schools in Earle Street. Other councillors supported the idea of a competition, but Alderman McNeill, the chairman of the Committee, whose opinions carry great weight in Crewe by reason of his having been mayor during 1882, 1895-6-7, and 1902, and being a county and borough magistrate and a member of the Cheshire County Council and the County Education Committees, succeeded in sustaining the action of the Committee. He said that at first he recommended competitions, but he had since had some experience of them. (This may be so; for the Crewe Town Council has held competitions in the last few years for the technical schools, the municipal offices now in course of erection, and other buildings.) Alderman McNeill contended that if they

went in for a competition they would get most expensive plans submitted, and assuming that in each case they selected the best, which they would be most likely to do, then the possibility was that they would spend from £2,000 to £3,000 more on a building than was absolutely necessary. What they wanted was a good substantial building that would last for many years, and would meet the requirements of the Board of Education as regards its internal arrangements. Other towns in the country had discovered, to their cost, that competitive plans proved to be very expensive. This is a fallacious view, and if it is the experience of Crewe we can only say that the conditions of competition were badly drawn up; it shows that the Council did not know its own mind. There is much to be said both for and against competitions, but not on the score of economy; the trouble is usually that local bodies ask for impossibilities in this respect. For such a small building, estimated to cost £20,000, it is doubtful whether the Crewe Council has not taken the right course. Competitions have been rather overdone.

An Experiment in Teaching Design.

PROFESSOR SIMPSON, of University College, London, is trying an interesting experiment in the form of a course of instruction in building construction and elementary design. On the first evening he explains the aim of the class; plans, sections and sketch elevations of a small country house being supplied to each student. On the next evening this design is presented drawn out in more complete form, with such modifications as each student may wish to make. This first design is in brick with wood sash and casement windows. On subsequent evenings the different parts of the building are worked out to, say, ½ in. scale. The first half of the evening is spent criticizing the drawings made during the previous week, the second half in lecturing on the particular subject for the ensuing week. The following are considered in detail and exercises set on each:—Walls and bonding, footings and foundations, arches and offsets, chimneys and fireplaces, carpentry, roofs, floors and partitions, external plumbing, slating and tiling, drainage, joinery, skirting, windows, doors, staircases, &c. The result is a complete set of working drawings of one design. In the Spring term one or more designs will be supplied as before in which various details of construction not previously considered—such as stone walling, hollow walls, stone-mullioned windows, steps, copings, structural ironwork, steel roofs, fireproof construction, areas, &c.—will be worked out.



T.S.S. "DURHAM CASTLE": OAK PANELLING IN DINING-SALOON: ELEVATION OF AFT END.

THE ARCHITECTURAL FITMENT OF SHIPS.

WHEN an architect is engaged to fit up the rooms of a ship he finds himself in altogether different circumstances to those he is accustomed to in buildings. As a rule he has only the barest sketch plan given him by the shipbuilders, and on this he has to build up his entire scheme. Moreover, the shipbuilders regard him with a jealous eye, though in the end they can be relied upon to carry out the work in far better style than the average builder; but they have an alarming way of putting in columns and all sorts of things which were never shown on the architect's plan. That the architect, however, has plenty of scope for design, the accompanying illustrations of the twin-screw-steamer "Durham Castle" show. This is one of the intermediate ships of the Union-Castle line, fitted up in the best possible style by the Fairfield Shipbuilding and Engineering Co., Ltd., of Glasgow. The saloon is panelled in oak and has a teak floor, the columns being cased in oak with beautifully carved Ionic caps (this carving, as all the rest in the rooms, having been executed by Mr. Crawford, of Glasgow). The massive staircase leading down to the saloon is also of oak. The light well is oval in shape and carried out in fibrous plaster.

In the reading-room the walls are panelled with mahogany inlaid with broad bands of coromandel and thin lines of satinwood, the ceiling being of wood painted ivory-white; the carpet is a rose colour, and the seats are covered with tapestry of subdued character. The smoking-room has a floor laid with red india-rubber tiling and seats covered with

rattan cane: a detail of one of them is given on p. 204; it is interesting as showing a new spring seat, not before used on board ship. The chairs in the smoking-room are

& Wigglesworth, of London, whose work is especially interesting for its refined character; in this respect being very different to the rococo work of the Germans. By the eleva-

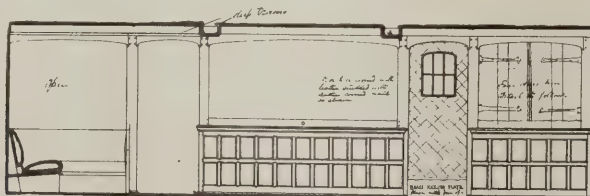


DINING-SALOON.

covered with green morocco and the walls are embellished with etchings and first-quality reproductions.

These rooms on the "Durham Castle" have been entirely designed by Messrs. Niven

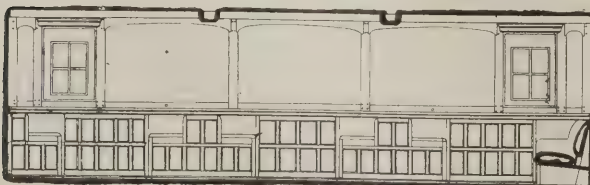
tions given on this page it will be seen that the wood is used straight, as should be in sound construction, not cut and bent about in all manner of shapes, irrespective of the grain.



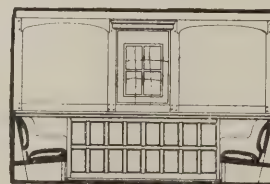
ELEVATION LOOKING AFT



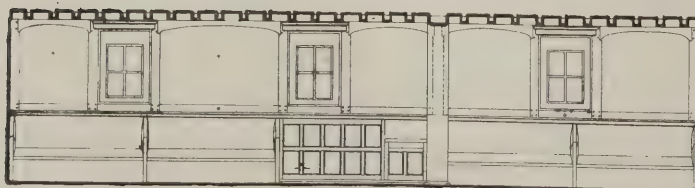
ELEVATION OF PORT SIDE



ELEVATION LOOKING FORWARD



ALCOVE LOOKING AFT



ELEVATION OF STARBOARD SIDE



ALCOVE, PORT SIDE



ALCOVE LOOKING FORWARD

POSITION OF LIGHTS
= BEAM FINISH



T.S.S. "DURHAM CASTLE": SMOKING-ROOM. IN OAK. NIVEN AND WIGGLESWORTH, ARCHITECTS.



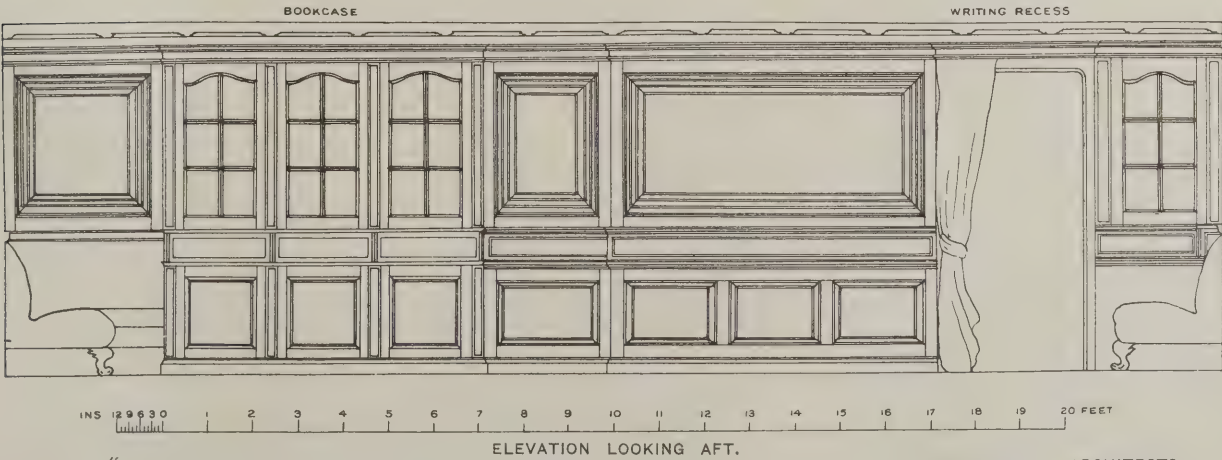
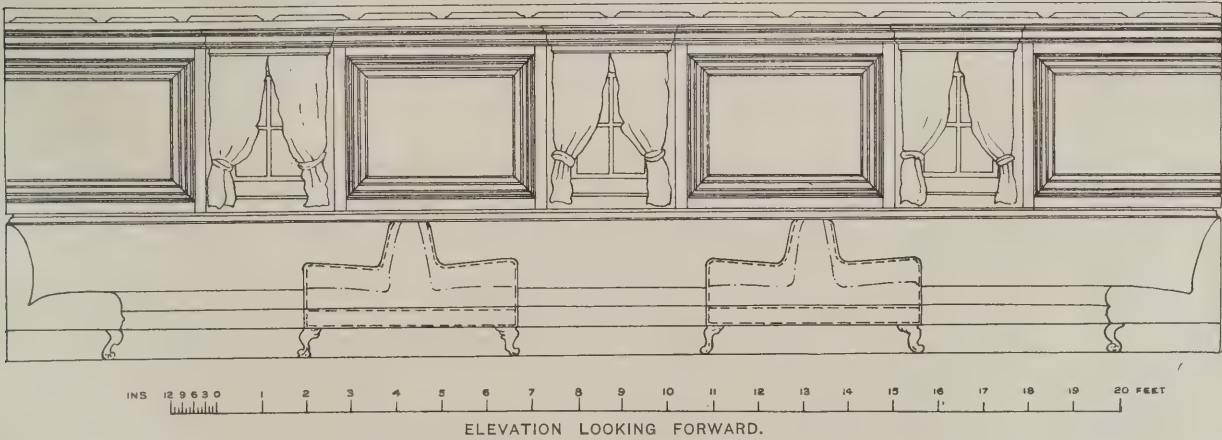
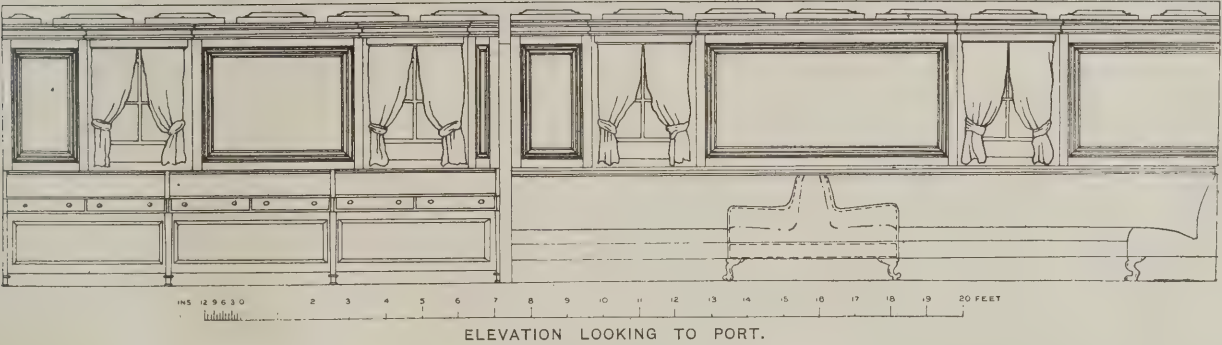
ARCHITECTURAL
ASSOCIATION.

Mr. Dockree on Photography as applied
to Architecture.

A MEETING of the Architectural Association was held on Friday evening last at 18, Tufton Street, Westminster, the chair being occupied by the president, Mr. E. Guy Dawber, F.R.I.B.A.

After the minutes and nominations had been read, the committee's report and balance-sheet for the past session was adopted on the motion of Mr. Cole A. Adams, seconded by Mr. Francis Hooper. The following additional donations to the Premises Fund were announced:—Mr. W. A. Aickman £5 5s., Mr. A. S. Gover £2 12s. 6d., Mr. T. L. Dale £1 1s., and Mr. T. R. Hooper £1 1s. Mr. E. Dockree then read a paper on "Photography as applied to Architecture." He said:—

If I commence my paper this evening with a few remarks on the ethics of "Photography as applied to Architecture," or in other words architectural photography, I must at once disclaim any intention of raising that wearisome and unprofitable



T.S.S. "DURHAM CASTLE": READING-ROOM, IN MAHOGANY. WITH INLAY. NIVEN AND WIGGLESWORTH, ARCHITECTS.



T.S.S. "DURHAM CASTLE": SMOKING-ROOM.

controversy over the respective merits of sketching and photography as a means of depicting buildings. I recognize that very exhaustive claims have been made on both sides—claims not supported by any substantial basis of fact; and while my personal sympathies naturally tend towards work with a camera, I am quite willing to grant that the use of the pencil by the architect and student is a very necessary and proper thing.

But architectural photography has its field. The late John Ruskin, no enthusiast concerning photography in general, said "it was the foremost means of translation or reproduction in a graphic form of architecture." I do not affect a belief that by this utterance the great art critic excluded all other methods of depiction; his own exquisite drawings of architecture would at once dispel such a claim. But I do believe that by this utterance he recognized the supreme claim of the architectural photograph—its impersonality. A drawing must necessarily be tinged with the individuality and perception, or want of perception, of its author; in short, you do not receive an impression of the building through your own eyes, but through the eyes of the artist—nay, it is but an impression of his impression. So that whatever pleasure you derive from the drawing as a drawing you do not necessarily receive from it the impression of the building that would result from a sight of it in the substance. Some medium is therefore required for affording an impersonal depiction of a building from which each beholder can draw his own deductions and impressions. Such an impersonal basis is afforded by the photograph, which I claim is the only effectual means for the exhibition of architecture; and by exhibition I not only mean a public display of architectural views but also their publication in books and magazines, or any other method intended to appeal directly to the criticism and judgment of the individual. The first case is even more important than the second, because if ever an impersonal basis is needed, it is required by a judge who has to decide the merits, not of drawings or photographs, but the buildings depicted in them. That I am not alone in my contention is shown by the efforts that have been and are still being made by some of the leading architects to obtain a revision of the Royal Academy rules with regard to architectural exhibits; a revision that would permit architects to

show their work by means of photographs, geometrical drawings and models, as well as or instead of perspective drawings, to which they are at present practically restricted.

My claim for the photograph as the best means of exhibiting a building will doubtless be met by two objections:—

(1) That the photograph can be "faked."

(2) That buildings seen in photographs are frequently distorted and are not truly represented.

Both these objections must be admitted; in regard to the first I might rest content to say, So can drawings. One has only to study perspectives at the Royal Academy for this fact to be self-evident. But if absolutely

sharp, clear detail be insisted upon in a photograph, it will be exceedingly difficult, if not impossible, to fake it without detection. Only fuzziness or impressionism will disguise the effects of manipulation. And architectural photographs in general cannot be too sharp. In regard to the second objection the fault lies entirely with the operator: if you see a distorted building, or one in impossible perspective, blame not the science but the photographer.

For the benefit of architects employing professional photographers I should mention that many of the monstrosities in architectural photography that one sees are due entirely to the architect, whose orders the photographer is naturally obliged to carry out, however much they go against his better judgment. The most common causes of failure are—

(1) The architect desires to get too much in one plate; he wants "to look over his head" or "round a corner"—in short, tries to achieve the impossible—in which amiable endeavour the photographer collaborates. Occasionally, for a special purpose, it may be necessary to take a somewhat distorted view. For instance, one of the photographs of Westminster Cathedral which is hung on the wall to-night is a very sharp perspective of the campanile from the roof of the nave. This photograph, which took me three hours to focus and get into position, was specially asked for by Professor Lethaby, who selected all the points of view. In general, the photographer should resist a request for a view he knows will appear distorted.

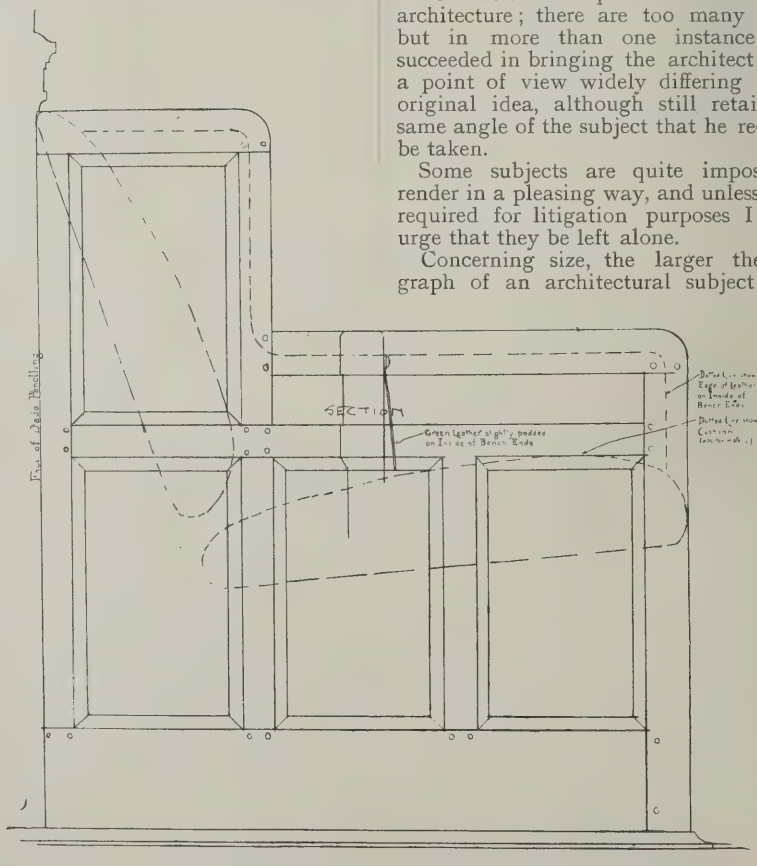
(2) The operator receives instructions to do "the best he can" (a favourite form of request), and with some operators the best does not amount to much. In this case the photographer goes blindly to work, never pointing out drawbacks or defects (from a photographic standpoint) in the views suggested, or offering a workable alternative.

I am tempted to add a third reason—a want of knowledge on the part of the operator of either the science of optics or the laws of perspective, or both.

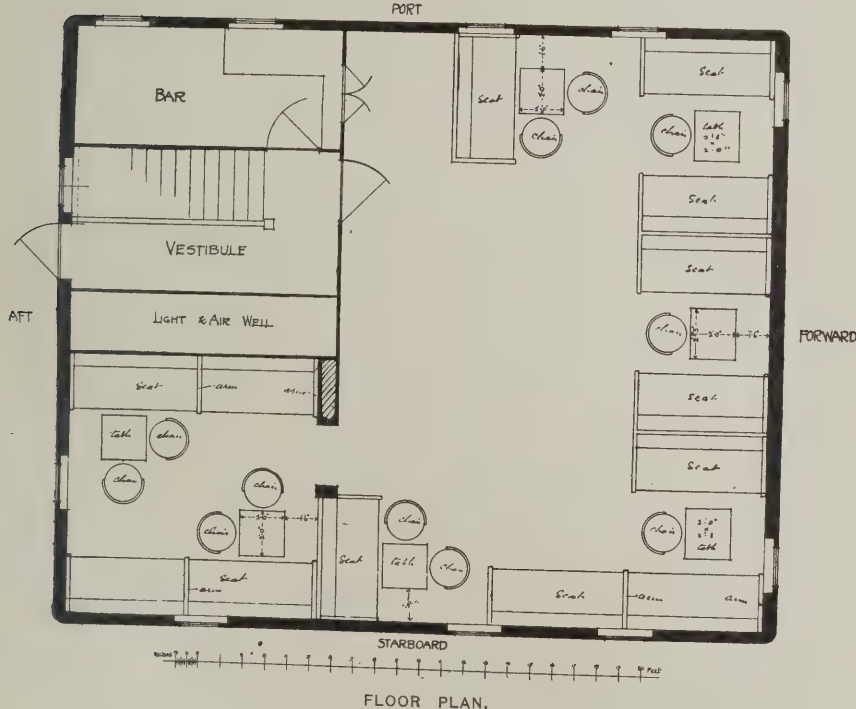
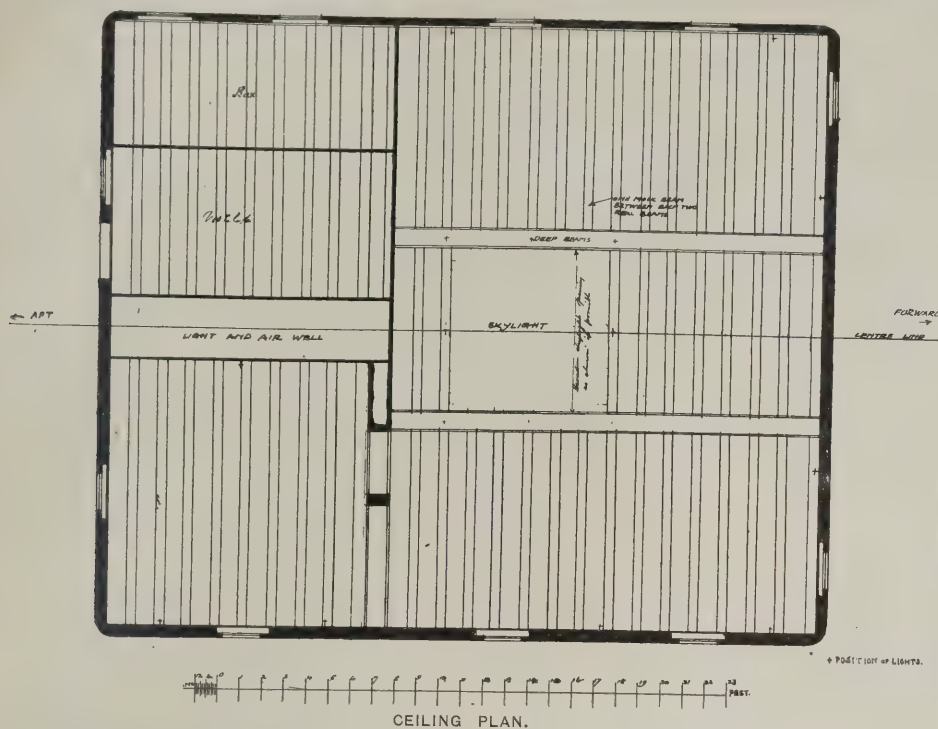
I do not wish to pose as an authority on architecture; there are too many already; but in more than one instance I have succeeded in bringing the architect round to a point of view widely differing from his original idea, although still retaining the same angle of the subject that he required to be taken.

Some subjects are quite impossible to render in a pleasing way, and unless they are required for litigation purposes I strongly urge that they be left alone.

Concerning size, the larger the photograph of an architectural subject can be



DETAIL OF SMOKING-ROOM SEATS.



T.S.S. "DURHAM CASTLE": SMOKING-ROOM.

made, the better in every respect: the details and the proportions of the structure are shown to a greater advantage. A small picture may be a gem of photography in its way, but you instinctively feel you would like to see it done larger. Of course, you can enlarge by means of one of various apparatus on the market, but why make two bites at a cherry? The resulting picture lacks that "quality" and "vim" only to be obtained by working direct. An enlarged negative is another alternative, but that requires a skill and power of manipulation far beyond the average amateur, who only requires one or two prints of the subject he is interested in. Again, small plates are "small" in price and tend to carelessness and slipshod work; whereas a large plate and its after manipulations compel you to walk round and study your subject—consider every standpoint—the final one being selected only after mature deliberation.

I would like, while still speaking generally,

to say a word about artificial light. For architectural work artificial light should never be resorted to if it can be avoided. Though an interior may appear absolutely dark to the naked eye, there are always rays sufficient to act upon a sensitive plate if time be given. Thus my view of the Chester crypt had to be focussed on a torch, consisting of a newspaper rolled up, lighted and held a certain distance in front of the camera. The plate was exposed for five hours, and a slide of the result obtained you will see later. Such prolonged exposures are not always possible, and one is frequently forced to employ some sort of artificial aid. Though I have never employed it, I believe acetylene gaslight is the best for photographic purposes, as the spectrum of this light most closely approximates to that of the sun. I have invariably used electric arc lamps when photographing the auditoriums of theatres and other dark interiors. In the case of All Hallows Church, Lombard Street, the very

dark interior of which I photographed in foggy February last year, the building was not wired for electric light and electric arcs could not be utilized. I therefore employed six lime boxes, using the oxy-hydrogen light, the gas being contained in portable cylinders. The resulting photographs are shown on the walls this evening. One light I warn you not to use for architectural purposes, and that is the one most commonly resorted to—flash-light, magnesium. Its use results in a white glare over the objects nearest to the camera and the elimination of detail in the background so that delicate undercut carving looks as flat and formless as a stencil pattern on a wall.

Unfailing patience and effort are required to obtain success in architectural photography. One must be prepared to work at it at all hours of the day and night. I have secured excellent negatives by exposing plates in the subdued light between 3 a.m. and 7 a.m. But as the fascination of the work gets a firmer hold of the worker, so the various difficulties are overcome and in the end practically disappear, the intervening stages serving to encourage the earnest enthusiast. There are obstacles to be overcome, undoubtedly, but none of such magnitude as cannot be surmounted by care and application.

Apparatus.

In dealing with my remarks on photographic apparatus and photographic processes, which I include in this paper for the benefit of those of you who are or intend to become architectural photographers, I have endeavoured to eliminate as far as possible technicalities or technical terms, hoping that my lay hearers may also understand and join in the discussion which I hope will arise.

The Camera.

Bearing in mind my remarks as to size, I would recommend nothing less than a whole plate or a 10×8 ; personally I use a 12×10 , and would a 15×12 if I could get about with it and all its appurtenances in a comfortable manner. The camera should possess double extension; that is, the "front" and "back" should be capable of being adjusted by means of a pinion and rackwork, the bellows slightly tapering; and the "front" carrying the lens should have a rising movement and, better still, a sliding movement in addition. All up-to-date cameras have a "swing-back" capable of two movements, to and from the lens, and a "reversing back" to carry the dark slide so that oblong and upright pictures can be obtained. Some workers find fault with the "turntable"; they assert focussing is a difficulty in a dark interior—what light there is coming up through the turntable from the ground or floor and detracting from the visibility of the image on the "focussing screen." This may be so, but personally I have found no inconvenience of any moment up to the present.

To my mind the turntable has advantages over the solid base-board: it reduces the weight of the camera, it facilitates your movements in finding the desired view, and gives rigidity to the whole apparatus, the last a most important feature when working with lenses of long foci and in exposed positions. The tripod stand or tripod used with the turntable should be folding, with a sliding leg—two- or three-fold, if of the right weight, is immaterial; the camera and tripod when set up for use should not exceed 5 ft. 6 ins. to 5 ft. 10 ins. in height, this being an average sight-line. A slow moving spirit-level, circular in shape, should be fixed on the "base-board" of the camera just at the side of the front; on the front itself at the top of the side a "plumb index" should be placed, and another one on the side of the "swing-back." These three working together accurately, place beyond dispute the absolute verticality of the resulting photograph.

Lenses.

The next thing to be considered, and certainly the most important one concerning architecture, is the lens or lenses. One lens will not do everything required of it; and before deciding what to get I would strongly urge the enthusiast to consult someone well versed in the matter and, if the pocket will allow, to purchase the best make possible. Then, should your results be not satisfactory, blame yourself and not the lens. I hold no retainer, so cannot advertise, but whatever make is selected let it be a lens giving no wider angle than 65 degs. for an interior subject, whereas 60 degs. to 65 degs. is a very pleasing range for exteriors of buildings.

If I quote "focal lengths" of lenses it will possibly only tend to confuse, so I will merely state that lenses for architectural work must be of the rectilinear type and possess great covering power and marginal definition; those of the genuine "anastigmatic" series are absolutely the finest procurable for the purpose.

I am afraid I must depart from my original intention to avoid "technical terms," but I have no alternative in giving the following particulars. Where the purse will allow I strongly recommend the earnest worker to procure a "battery" of lenses for his use: for instance, for a whole-plate camera a 6½in., 9in. and 12in. focal lengths; for a 10 × 8 camera an 8in., 11in. and 14in. focal lengths; and for a 12 × 10 camera a 10in., 13in. and 16in. focal lengths. And to the last-named I would add an 8½in. lens.

Focussing.

The apparatus complete, the first operation after the selection of your view is the "focussing." The screen upon which this is effected should be ruled into small squares, say, of an inch; this will facilitate the worker in composing his picture. In "focussing" get your subject as sharp as you can, roughly so at first; see your vertical lines are vertical, and not, as one sometimes sees, converging to meet at some point. Your "uprights" not being true, the camera must be generally "levelled" and the "swing-back" manipulated until the said lines are vertical, the levels all working true to each other; your picture should then be dead "upright." Now re-focus, fixing upon some object midway between the camera and the middle of your subject; note the appearance of the same at the top, bottom and sides of your screen, using the lens's stops to bring the whole view into general sharpness -- and in architectural work I have already said it cannot be too sharp.

Exposure.

The knowledge of the exposure to be given is only gained by experience; there is no fixed rule, subjects, light and shade varying to an enormous degree. But bear this in mind: always give plenty—look after the shadows; the "high lights" will look after themselves. Better over-exposure than under-exposure: the former can be modified in development, but no amount of development will give detail which through under-exposure is not in the plate. Bear in mind that each consecutive stop requires twice as much exposure as the one immediately preceding it.

Plates.

Those having a medium rapidity will be found the most serviceable, satisfactory and easy to work. Some workers like one make of plate; others prefer another; personally I think the Imperial Company's or Elliott's Barnet give all that is required of them, but every plate used must be "backed." The difference in the resulting picture obtained from a "backed" and an "unbacked" plate is most marked; in fact, in some cases, especially where windows assert themselves in an interior, a "backed" plate is an absolute necessity, otherwise "halation," the burbear of photography, will be so evident

as to quite mar the picture, though everything else is quite satisfactory.

Developer.

One composed of pyro, in combination with potash or soda as the accelerator, is, to my idea, the best for the class of work under consideration. It yields, if properly adjusted in its components, a negative soft but vigorous, the class best suited for printing in either "silver" or "platinum." In development the watch-words should be "Detail first, density afterwards," not the reverse: to obtain the correct gradation keep your pyro down to a minimum, to start with; it can easily be increased as development proceeds.

All detail out and the desired stage of density reached, rinse the negative well and fix in the usual manner—say, for ten to fifteen minutes—in hypo 1 oz. to each 4 ozs. of water; remove; well wash under running water for forty minutes to an hour; drain and stand to dry in a place free from dust and draught.

The negative now obtained, when dried, should be carefully examined, and the various defects, such as pin-holes, &c., remedied, and the shadows, if too pronounced, should be strengthened by one of many devices, such as papering, &c., on the glass side.

Prints.

I have no doubt that the numerous printing processes are known to you; each one has his own particular idea in that direction. But a note on prints intended for reproduction by the press may not be amiss.

A print to give the finest block for reproduction is the "silver print." By that I mean that done on one of the various P.O.P. papers and toned with gold. I prefer that toning which includes sulphocyanide of ammonium; the range of tones and the latitude it gives is excellent. The "process worker"—by that I mean the block maker—likes a good plucky blue-black print full of "vim" and contrast; it yields a block far superior to any other class of print.

In bad or dull weather one of the numerous "gaslight papers" must be employed; no toning is required, the image being developed by one of the various "Metol" formulae.

For framing and keeping for show purposes there is no process equal to the carbon or platinum, but suitable negatives are required to give the finest results—any class of negative will not do: for carbon a strong plucky negative, and for platinum a soft but vigorous one.

My paper is now ended. I am aware that on many points I have only been able to touch briefly; but I shall be most happy to answer any questions or explain any matters arising out of the subject. I will now submit for your inspection some of my slides.

[The slides thrown on the screen numbered 160. They were selected out of more than 3,000 made by Mr. Dockree from negatives taken by himself and Mr. Ashton of buildings in various parts of Italy, France, England, &c., and they included a number of sculpture and metal-work subjects, some of them coloured with remarkable skill.]

A vote of thanks to Mr. Dockree was proposed by Mr. A. C. Bulmer Booth and seconded by Mr. C. H. Freeman. The former spoke of the excellent way in which the different textures—stone, bronze, marble, plaster, &c.—had been rendered, while Mr. Freeman referred to the Sandell plate for architectural work, observing that, with the exception of some photographs taken by Mr. Sandell himself, he had never seen anything satisfactory done on this plate. A letter was read from Messrs. S. B. Bolas & Co. in which they took exception to some of Mr. Dockree's remarks, particularly in respect of the use of magnesium for flash-light and the focal lengths of lenses for architectural photography.

In defence of the former they sent several interior views of theatres (though, compared with Mr. Dockree's work, these were decidedly inferior). Regarding the focal length of lenses, they said that everyone knew an 18in. was most satisfactory to use, but ninety-nine times out of a hundred one had to employ a 9in., which covered an angle of about 120 degs. Messrs. Bolas also sent some postcard reproductions of their photographs of Westminster Cathedral; the exteriors having been taken with a 10½in. lens and the interiors with 9in. and 10½in. lenses.

In bringing the meeting to a close, Mr. Dawber said how much he admired the splendid collection of architectural photographs which had been hung around the room—these numbering over 200 and being mostly the copyright of THE ARCHITECTURAL REVIEW. He was especially struck with the wonderful detail in the shadows, while preserving the quality of the high lights, and he expressed his thanks to Mr. Dockree—and to Mr. Ashton, who operated the lantern so skilfully—for giving them such a delightful evening.

GLASGOW TECHNICAL COLLEGE.

THE annual report of the Glasgow and West of Scotland Technical College for the past year has just been issued.

A joint committee representing the college and the Glasgow School of Art has conducted negotiations with a view to the complete utilization of the resources of both institutions in the maintenance of an efficient School of Architecture. These negotiations have been satisfactorily concluded, and a joint curriculum has been agreed upon which provides for a course of study extending over three sessions in day classes, or, alternatively, a course extending over five sessions in day and evening classes, and leading to a joint diploma in architecture to be issued by the two institutions. The professor of architecture and building construction in the Technical College and the director of architecture in the School of Art will be responsible for the architectural instruction to be given. It was thought, however, that the object in view would be best attained by the appointment of a highly qualified architect as visiting professor, who would form a strong connecting link between the two institutions. Mr. Eugène Bourdon has therefore been appointed in this capacity. He is a Bachelier des Lettres of the Sorbonne, an Architecte Diplômé of the French Government, and Lauréat of the Société Centrale des Architectes. He had a very distinguished career as a student, and has since been engaged on important commissions in Paris and New York.

The Industrial Arts Department, with the exception of the classes in lithography, has been incorporated in the reorganized department of architecture. The Architectural Craftsmen's Society has a membership of 120. The total number of students attending the college last session was 5,333.

The erection of the first section of the new buildings for the college has proceeded satisfactorily, and the main structure is now nearly completed.

The new Museum and Art Gallery at Kingston-on-Thames is to be opened by the Earl of Rosebery at the end of this month. The architect of the new free library, Mr. Alfred Cox, A.R.I.B.A., was entrusted with the design, which has been carried out by Mr. E. Chamberlain, of Addlestone. The principal front is to Fairfield West. The museum is 45ft. by 24ft., leading out of which is a lecture-hall 40ft. by 27ft. with dome roof. The art gallery occupies the first floor and is 45ft. by 24ft.

MANCHESTER SOCIETY OF ARCHITECTS.

President's Address.

THE Manchester Society of Architects opened its winter session last Thursday, when Mr. J. W. Beaumont, F.R.I.B.A., delivered his presidential address for the second year in succession. He congratulated the Society on its prosperous condition in the fortieth year of its existence. He thought it would be a great public benefit if in all towns possessing an art gallery the municipal authorities would devote a portion of it to the formation of an architectural gallery or museum where, by means of casts and drawings and reproductions, the history of architecture might be studied. In such a museum also there might be a collection of building materials, especially specimens of those materials most suitable for use in the locality. In it should also be preserved by means of drawings and models a record of the old buildings which in so many towns had, by the course of events, to be cleared away in order to make room for improvements and extensions. There were very few places outside London where the art student had facilities for studying his art from actual examples, and it was only by enlisting the sympathies of the public in matters of art that they could expect to make such a museum successful. It should be one of the duties of their Society to make the attempt. He was convinced that in doing so they would have the sympathy and hearty co-operation of the members of the committee of the Municipal School of Art. This committee had taken an excellent step in founding a collection of architectural subjects at the school of art in Cavendish Street, but to be of better use to the public it should be on a large scale and housed in a more central position. In Dublin there was an excellent collection in the Art Gallery of examples illustrative not only of early Irish architecture but also of many of the finest buildings in Europe. It was to be hoped that when a new art gallery was built in Manchester the Corporation would provide for an architectural gallery and museum.

After referring to registration, Mr. Beaumont said that before many years had passed Manchester would have become a very important centre for the education of architectural students, who would be drawn from all parts of the surrounding districts by the training which would be given at the Manchester School of Architecture. It was most encouraging to learn that a very fair number had entered for the degree course.

Mr. Beaumont next spoke of Liverpool Cathedral, and then of the new Manchester infirmary. He said that an important question which would before long have to be decided was what was to be done with the site when the old infirmary buildings were removed? His own feeling was that it should be left an open space, possibly laid down partly with grass and planted with trees. On this space he would reserve position for statues of those of their townsmen who were considered worthy of honour, and statues of public men. If this large space were left open and many of the surrounding properties rebuilt, Manchester would possess one of the finest squares in the world. Their old city certainly wanted brightening up, for it had in many parts only a second-rate appearance. After alluding to the narrowness of the streets, he argued that the best material to use for facing the buildings in such thoroughfares as Market Street was cement, on condition that the Corporation had authority to compel owners to paint it every two years. He might be considered rather a heathen for suggesting this, but he believed if it were carried out their streets would be brighter, cleaner and healthier.

Keystones.

In Kingsway, the new street from Holborn to the Strand, 150 trees are to be planted.

A Statue of the late Lord Russell of Killowen, which has been executed by Mr. Brock, R.A., will shortly be placed in the central hall of the Law Courts.

The Opening Meeting of the R.I.B.A. will take place on Monday evening, November 7th, when Mr. Belcher will deliver his presidential address.

Forum Excavations Resumed. — With the return of Commendatore Boni from his long scientific tour abroad the excavations in the Forum at Rome are now being resumed.

New Premises for Messrs. Robinson & Cleaver have been built at the corner of Beak Street and Regent Street, London. There are eight floors. Messrs. Crickman & Sons were the architects.

Use of Electricity in Factories, &c. — The Home Office has issued a draft of the regulations proposed to be made for the use of electricity in factories and other places in pursuance of section 79 of the Factory and Workshop Act, 1901.

The Laing Art Gallery at Newcastle-on-Tyne was opened last week. It is a two-storey building with a large entrance in Higham Place admitting to the sculpture hall and three lofty galleries extending behind the library. The upper floor consists entirely of top-lighted galleries, each 65 ft. by 27 ft. by 27 ft. high. Messrs. Cackett & Dick were the architects.

The Sanitary Institute: His Majesty's Patronage. — His Majesty the King has graciously consented to give his patronage to the Sanitary Institute, which was founded in 1876 and is carrying on a large work in teaching and examining in hygiene and sanitary science, both in the United Kingdom and in other parts of the Empire. It maintains in London a permanent museum of sanitary appliances, open free to the public. Its members and associates number over 3,000.

Mosaic Work in London. — The decorations at Lyons's new "Popular" café in Piccadilly are particularly lavish, and include two glass mosaic figure panels in the entrance. These are life-size and represent "Night" and "Morning." They were executed by Mr. H. D. Hibberdine, of 9, Argyle Place, Regent Street, London, W., who also carried out the Roman mosaic pavements on three floors at Lyons's café. This firm also carried out the contract for the gold mosaic walls throughout the Trocadero. Considering the advantages offered by mosaic for the decoration of buildings in large towns, on account of its durability, cleanliness and sanitary nature, to say nothing of its artistic value, one is surprised it is not used more.

A sum of £150,000 lent to London Borough Councils. — The London County Council has agreed to lend the Bethnal Green Borough Council £30,000 for pipe sewer reconstruction works; the Kensington Borough Council £12,050 for a street improvement; the Lambeth Borough Council £7,786 for jarrah wood-paving works; the Poplar Borough Council £2,400 for the purchase of a site for a dépôt; the Stepney Borough Council £23,960 for an electric-light installation and meters; the Stoke Newington Borough Council £2,350 for paving works; and the Wandsworth Borough Council £36,000 for contributions to street improvements. They have also given their sanction to the borrowing by the Westminster City Council of £2,146 for brick- and pipe-sewer works, and by the Kensington Borough Council of £7,600 for street improvement.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

President's Address.

THE opening meeting of the session of the Sheffield Society of Architects and Surveyors was held on Thursday last, when Mr. Thomas Winder, A.M.I.C.E., delivered his presidential address. He said: —

There are at present no "burning questions" affecting us professionally. Registration, having been taken up by the R.I.B.A., should, I think, be treated by us as *sub judice*, especially as most of the allied societies have expressed their opinions upon it and have nominated representatives upon the committee which the Institute has formed to consider it.

I would take this opportunity of impressing upon members the importance of loyalty to the principal representative bodies of our professions. I believe, however, such loyalty would be better assured were we properly represented on the councils of these institutions. For some years past our Society has not been represented on the council of the Institute, a state of things which we feel should not continue.

The Institute

is capable of even greater usefulness than at present. I cannot understand why it leaves the Competition Reform Society to do work which I think should be done by itself. It is now many years since our then president, Mr. Reginald Fowler, expressed the hope that we might soon be allied to the Surveyors' Institution, but this desirable alliance is still unaccomplished. We could be of mutual assistance to each other, and at this time we need to stand shoulder to shoulder to resist encroachments which are being daily made upon our duties by members of other professions—witness the fearful and wonderful plans recently drawn and deposited by a judge whose own profession is protected by law against amateur encroachments.

Last year I expressed my views upon

The Administration of By-laws

by local authorities, and the experience of the past year has in no way modified such views. A suggestion was recently made that the Corporation should nominate a court of appeal to which aggrieved property owners could have easy access. If such a court were properly constituted it might do valuable work. It should, however, consist of sensible men who would not take the usual official and erroneous view that property owners, builders and even architects and surveyors are continually attempting to evade the law and scamp their work. What we ask is, that councillors should make themselves acquainted with the true facts of the case, and that common-sense and uniformity should be exercised in the administration of the by-laws.

We have heard nothing more of the proposed new by laws, but we have the assurance of the town clerk that we shall be consulted before these are finally put forward.

Need for Consolidation.

Has not the time fully arrived for the consolidation of by-laws and of local and other Acts of Parliament relating to new streets and buildings? At the present time one's knowledge needs to be as extensive as that of the daring property owner who attempts to take advantage (save the mark!) of the London Lands Registration Act of 1899, with its three hundred and odd rules. Why, for example, should Chapel-en-le-Frith, which embraces an extensive country district, require rooms of greater height than Sheffield with its slums and smoke. It is with grim satisfaction that I have read the remarks of urban and city officials upon the administration of the Model By-laws by the Local

Government Board; an application which we are told renders it impossible for urban authorities and corporations to compete with builders and private enterprise in the erection of artisans' dwellings, a result which I am sure none of us regret, professionally or as ratepayers.

Municipal Housing.

It is to be regretted that a section of the Sheffield Corporation still adheres to the policy of providing artisans' dwellings, but I am thankful to see that this question has been taken out of the arena of party politics, and those men of each party whose opinions we value most highly are giving the subject careful and fair consideration, apart from party interests. The provision by corporations of dwellings for artisans as at present carried out is totally unnecessary and extravagant. The private capitalist does, and will if given fair play, provide more than enough of such dwellings at a reasonable cost, as witness the ridiculous fiasco at a Local Government enquiry held in a neighbouring town. After the inspector had been assured of the great need for corporation-provided artisans' dwellings evidence was given that something like four hundred of the cottages in that town were unoccupied.

Galvanized Iron Huts for the Very Poor.

The provision of cottages for the extreme poor is quite another matter, and none of us will grudge those even if provided at an apparent loss. Ordinary cottages are completely worn out in less than one hundred years. This is fortunate, as long before that time has elapsed most of them are out of date, sanitarily and otherwise, and very many of them are then in the wrong part of the city. This will be even more so in the future, as the extension of rapid transit in, around and (I hope before long) far outside our towns and cities will solve the artisans' dwellings question. I would suggest that the extreme poor should be catered for by the erection of one-storey wood and galvanized iron huts upon land to be purchased by corporations. These have a life of twenty to twenty-five years, and I am assured by those who have lived in them that they are very comfortable. If properly protected wood is used the risk of fire should be almost nil, and if fire did occur there would be little danger with single-storey buildings. At the expiration of twenty to twenty-five years these huts might be destroyed and new ones erected in more convenient positions. The increased value of the sites would often show a good profit on the transaction.

Loans.

Last year I drew attention to the danger of the heavy trades being driven from Sheffield through the administration of the by-laws, but a far more probable cause of this is the awful increase in our rates; an increase largely consequent upon the reckless manner in which Sheffield is keeping ahead of most other towns and cities in the amount to which its rates are mortgaged. A further loan of £270,000 is to be asked for in addition to the $5\frac{1}{2}$ million pounds we already owe. The president of the Auctioneers' Institute in his very able address informed his hearers that Sheffield is indebted to about £10 per head of population, but it perhaps puts it more graphically to say that it is indebted to the extent of probably £50 per ratepayer, and the Corporation is asking for power to increase that indebtedness by another £6 or £8 per ratepayer. The payment of interest and sinking fund upon these loans constitutes a very serious burden upon property, and although we are constantly told that part of this debt has been incurred for profit-earning concerns (profits, by the way, to be earned from the unfortunate debtors, the ratepayers) we know that other parts are for work which has since become more or less obsolete, and some of which has actually been replaced by work paid for out of later loans. Those of

us who are daily dealing with values of property are only too well aware of the seriousness of the position which is being created throughout England and Wales by this second national debt, a debt which now amounts to almost 343 million pounds. It is satisfactory to see that the Public Loan Commissioners are making a decided stand against further increases. I believe the present slump is largely due to the fact that for some years past we have, in addition to our incomes, been spending vast sums of borrowed money, thus creating an artificial prosperity, and whilst perhaps delaying the periodical visit of bad trade, leading to a far greater depression in the end. In proof of this, the demand for building land is less at the present time than I have known it during an experience of a third of a century.

A Chronicle of Architects.

Last year I suggested the desirability of the Sheffield Society of Architects and Surveyors undertaking the chronicling of the names of architects of old and new buildings in Sheffield. I am the more convinced of the desirability of this being done from noting how seldom the architect's name appears in notices of new buildings in the daily press, even where such notice is illustrated by the architect's own drawings. I also mentioned the work which we might do towards the preservation of archaeological facts and drawings, and although our Society has done nothing towards this, I am pleased to see that a local branch of "The National Trust for places of Historic Interest or Natural Beauty" has been formed.

Charges for Street and Road Works.

A question which concerns us as surveyors and valuers is that of street dedication charges, and of the costly way in which road-making is done in cases where it can be imposed upon the owner.

During the past year I have come across the two following cases. A person paid £700 for an old property abutting upon two streets. He received an account from the Corporation for £217, or almost one-third of the price he had paid for the property, this being dedication charges upon one of the streets. Another owner with four cottages showing a gross rental of £70 per annum was mulcted in about two years' gross rent. Each street was made upwards of twenty-five years ago at a cost of probably £3 per lineal yard, and has since been maintained by the owner. These are but two out of scores of cases, but they are particularly hard upon the owners from the fact that each property abuts upon two streets. It is patent to everyone that

Cottage Properties do not require Frontages to Two Streets.

and that the second street in each case must have been provided for the benefit of the public. Unfortunately there is an idea amongst certain of our citizens that the ownership of property is a crime to be punished wherever possible by the infliction of charges in one form or another, but we, as experts in property, should do our best to educate them out of this, remembering that those who are most hardly hit by these grossly extravagant dedication charges are the thrifty lower-middle classes and the careful working man, who has often invested the whole of his savings in the purchase of a home, only to find that his thrift has landed him in serious financial difficulties.

Taxation of Ground Values.

The Bill recently before Parliament for the taxation of ground values deserves careful consideration by us. Its supporters claim that it is needed to counteract the holding-over of ground by landowners with a view to the obtaining of an increased price. This is fallacious, as such holding-over seldom occurs.

The greatest difficulty in the administration of the Bill, should it become law, will be the determination of what is building land.

Six years ago a client of mine was compelled to pay succession duty (in itself a heavy tax on land), at building land valuation, upon 10 or 12 acres of land, which my brother and I rightly contended was merely agricultural land, and although I have advertised this land I have not received half a dozen applications for building plots upon it, and more eligible land abutting and near it has just been sold by public auction at about one-third the value put upon mine by Somerset House. Had this Bill become law six years ago, my client would by now have paid six years' rates, at building land value, for land for which there is no demand, and which is let at about 26s. per acre per annum. Any legislation which tends to reduce the open spaces in and around our centres of population will be as injurious to public health as Pitt's window tax, and such must be the result should the Bill become law, as the authorities must in fairness tax *all* open land which the ingenuity of the rating surveyor can possibly ticket "building land," including commons, parks, recreation grounds, squares and those valuable adjuncts to our large towns and cities, the old-fashioned gardens of mansions.

As architects and surveyors we should be interested in the question of the universal adoption of

The Metric System.

This has been largely adopted in other countries, and although strongly recommended by our chambers of commerce we are too conservative or too conceited to follow suit. Our commerce is suffering in consequence, and all who have to make much use of figures lose valuable time by the present system. Our valuations, estimates and quantities would be more readily calculated in decimals. The Ordnance surveyors have recognized this and have adopted decimals in showing the contents upon the new Ordnance maps. I think we should support the Bill which is being promoted to introduce the system universally.

I should like to remind bankers who are desirous of establishing themselves in Sheffield that it is only fair to employ Sheffield architects. Clergy and chapel trustees should also remember that there are architects in Sheffield who are quite as capable of erecting churches or chapels as are outsiders, and even of decorating those which they have been permitted to erect.

Attention should be drawn to the acceptance by Somerset House of valuations for probate made by persons who are totally incompetent to make a fair valuation, but who do this work at prices which a properly qualified man cannot possibly afford to do.

In conclusion, I had intended to say something upon the

Valuations submitted by Witnesses

in arbitrations, &c., but after a careful comparison of the reports of numerous cases I find umpires and juries have discovered that a fair value can generally be arrived at by taking the average between the amounts given by the valuers on each side; and as the figures from which I have arrived at this conclusion contain such examples as the following, taken almost at random—

Valuation on behalf of vendors	£	Valuation on purchasers' behalf	£
- 20,108		- 13,808	
- 1,301		- 387	
- 3,125		- 900	
- 12,594		- 950	
- 4,392		- 1,562	
- 3,009		- 251	
- 2,786		- 1,129	
- 20,238		- 13,122	

—figures which were supported on each side by well-known competent professional men—I have come to the conclusion that the question is far too vast for my comprehension, and that whatever one may think it is perhaps best to say little beyond asking, Is this one reason why Somerset House does accept valuations from men who are not known as competent valuers?

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Book on Refuse-Disposal.

BRIDPORT.—H. C. writes: "Kindly recommend a good book on refuse-destructors." "Refuse-Disposal and Power Production," by Goodrich, price 16s. 9d. from our offices. A series of articles on refuse-disposal plants in various parts of the Kingdom has appeared in the "Public Health Engineer."

Drill Halls.

NORTHAMPTON.—VOLUNTEER writes: "Have you ever published any plans and illustrations of volunteer and other drill halls?"

An illustration of a drill hall erected at Creswell, Derbyshire, was given as a centrepiece in THE BUILDERS' JOURNAL for April 29th, 1903, and some particulars of it on p. 165 of the same issue.

Charge for Coping.

MANCHESTER.—Q. writes: "An architect states in his quantities that an item of 147 lin. ft. of coping is required, of Enfield make, and wants filling and setting as usual. The next item reads: 'No. 28 pieces of above coping to fit ramps to details each about 4ft. gins. long and 1ft. gins. high and made in four blocks to each ramp.' Am I right in thinking that the pieces to form the ramps are included in the first item for straight measure, and that the second item is for charging as extra value in forming to ramps?"

The item of "No. 28 pieces of coping" clearly covers the whole of the material and labour required for these, and is not an item of "extra value in forming to ramps."

W. E. D.

Plaster-cast of Ornament.

DEVIZES.—R. A. H. P. writes: "I send a photograph (not reproduced) of a cast in the local art schools. They have no record of it. Is it a cast of ornament of any architectural importance? Is it worth making a light and shade sheet of the cast for the R.I.B.A. final examination?"

The cast is of no value or importance whatever. It looks like a piece of French carving, coarsely executed and clumsy in design. The best thing to do would be to select a piece of carved ornament, such as a bench-end, a capital or a corbel from a local church. Failing this, write to Messrs. D. Brucciani & Co., 254-258, Goswell Road, E.C., for a cast of the acanthus scroll on the monument of Lysicrates, or of the enriched frieze of the Erechtheum: but it is much better to work from an original rather than from a cast.

G. A. T. M.

Taking out a Patent.

B. writes: "I am thinking of bringing out a small patent and shall be glad if you can tell me what it will cost to get same protected for a short time."

The stamp fee on provisional protection is £1. The protection lasts for nine months and is expressly intended to help inventors in placing their ideas before manufacturers. Thus they are enabled to test the practical value of their inventions without going to the expense of a full letters patent, the stamp fee on which is £4. Nevertheless it is not possible to bring an action for infringement on a provisional protection. Write to the

Comptroller of the Patent Office, Southampton Buildings, Chancery Lane, W.C., for forms and particulars, and read our remarks on p. 115 of the issue for March 9th last and p. 33 of the issue for March 5th, 1902. The new Patents Bill, under which a preliminary examination into the specifications of the past fifty years will be made by the officials at the Patent Office, is to come into force next January.

Temporary Buildings in Gardens.

LONDON.—ASSISTANT writes: "(1) In the event of a temporary building such as a small studio (of wood and iron, or wood and other covering) being erected in a London garden, must permission be first obtained from the district surveyor and the L.C.C. for its erection? (2) In that event, would a licence have to be periodically obtained? (3) Could the building be removed by the tenant at the end of his term if it rested only on a few piles? (4) Would it become the property of the landlord if on brick foundations? The building would probably be about 20ft. by 12ft. by 10ft. to the eaves, with a north light and a collar-beam roof."

(1) By the London Building Act every building, without exception, within the county of London is required to be enclosed with walls of brick of a certain thickness prescribed by the Act. The L.C.C. has, however, the power to sanction buildings of a temporary character which do not comply with the Act, and to obtain such sanction an application should be made to the superintending architect, 14, Spring Gardens. The application must be in writing on foolscap, and should state the name and address of the applicant and of the person or persons on whose behalf the application is made, and the purpose for which the building is intended to be used. The application should be accompanied by a block plan showing the position of the proposed building and of any adjacent buildings, and by a working drawing to a scale of $\frac{1}{4}$ in. to a foot showing the construction. These drawings must be on tracing linen and should have a margin of sufficient size to allow the approval of the Council to be engrossed upon the drawing. In the event of the application being approved, a second copy of the drawing will be required for the information of the district surveyor. A fee of 5s. is payable to the Council with the application and a further fee of 5s. is due on the application being approved. (2) Temporary buildings are usually approved for a period of three years, but at the expiration of that period an application may be made for a further extension, provided the building in question is certified by the district surveyor to be in good condition, for which service the district surveyor is entitled to a fee of 10s. if the temporary building has been erected less than three years, and a fee of 20s. if it has been erected three years and upwards. These fees are irrespective of the fees payable to the district surveyor for superintending the erection of the building, which fees are set out in the schedule of the Act and are calculated by the size of the building. (3 and 4) The question of the right of the tenant to remove the proposed building does not depend upon whether the foundation upon which it rests is composed of wood or brick, but upon whether the building is attached to such foundation, or merely rests upon it with nothing but its own weight to keep it in place. In the former case it has become a part of the freehold and belongs to the landlord. In the latter it remains a chattel belonging to the tenant, and may be removed by him just as a movable garden chair might be. These respective rights, however, may be (and very often are) altered by the lease granted to the tenant; and this should be inspected in order to ascertain whether any such alteration has been made in the present instance.

Views and Reviews.

Usill's "Surveying."

This book has long established itself among standard text-books for students, and a new edition—the eighth—is now before us. The author being no longer alive, it has been thoroughly revised and enlarged by Mr. Alexander Beazeley, M.I.C.E., and a chapter has been added on licences for practice in the Colonies. The book is fully illustrated and deals with every branch of surveying. To promote its use in the field, the publishers are now issuing a thin paper edition in limp leather covers so as to be easily carried in the pocket.

"Practical Surveying," by George William Usill, A.M.I.C.E. Eighth edition. London: Crosby Lockwood & Son, 7, Stationers' Hall Court, price 7s. 6d.

Building Stones.

This is another compilation from "Building World," of which Mr. Hasluck is the editor. A great deal of practical information is given respecting the quarrying, working and weathering of stone, though in so small a compass the particulars must necessarily be rather "scrappy." Still, as a handy little sixpenny manual it will appeal to a large number of persons concerned with building.

"Building Stones," edited by Paul N. Hasluck. London: Cassell & Co., price 6d. nett.

Hardwoods.

Another sixpenny handbook, a companion to that on "Soft Woods and Colonial Timbers" in the same series. It gives particulars of all the well-known hard and fancy woods, English and foreign, used by the carpenter and cabinet-maker, but its illustrations are feeble.

"Hardwoods," by Percy A. Wells. London: Percival Marshall & Co., 26-29, Poppin's Court, Fleet Street, price 6d. nett.

Workmen's Houses.

At a time when great attention is being given to the provision of cheap houses for the working classes, this second edition of Mr. Cranfield's and Mr. Potter's book is especially welcome. The elevations are in every case economical in treatment and neat in appearance; one only wishes that such houses as these were erected in place of the wretched rows spluttered around every town. In this second edition the plans, which are divided into groups according to the accommodation provided, have been entirely redrawn and revised so as to bring them thoroughly up-to-date; and many new plans have been included. An elevation for each group is given, and the plans range from one-storey cottages to terrace houses of 12ft. to 20ft. frontages and double- and three-tenement cottages having frontages between 15ft. and 28ft. As an example of the type of house dealt with we may take plan F₂, with a frontage of 32ft. for two dwellings. Here the accommodation of each house comprises on the ground floor a parlour 11ft. 6in. by 10ft. 7in. and a living-room 13ft. 9in. by 11ft. 7½in., with scullery and w.c., and three bedrooms above respectively 13ft. 9in. by 11ft. 6in., 10ft. 4½in. by 11ft. 7½in. and 9ft. 3in. by 8ft.; the area of ground covered being 1,060 sq. ft., the contents 25,280 cub. ft., and the cost, at rd. per ft. cube, £105 6s. 8d. Detailed remarks facilitate comparison between the various plans, and an appendix gives the clauses of the L.G.B. Model By-laws governing the building of small houses, together with some notes on their application in rural districts; also the by-laws of the London County Council. The book is in every sense well done: it furnishes a great deal of information about the disposition, planning and cost of small houses; and the illustrations are to a sufficiently large scale to allow every detail to be studied thoroughly.

"Houses for the Working Classes," by Sydney White Cranfield and Henry Ingle Potter, A.A.R.I.B.A. London: B. T. Batsford, 94, High Holborn, W.C., price 2rs. nett.

Electrical Notes.

Wooden Electric-Light Fittings.

With the advent of the new art there has been quite a revolution, and a necessary one, in the design of electric-light fittings. Some of these were very grotesque, and fortunately they have died a natural death, but it has been felt for some time that metal-work was not always in place where certain styles of decoration had been adopted. Recently Messrs. Jesson & Birkett, of Birmingham and London, introduced some designs for electric-light fittings constructed of fumed oak, and we now have before us a most complete and original catalogue of such fittings by Messrs. J. S. Henry, Ltd., of 287-91, Old Street, E.C. The catalogue itself is quite a work of art, and some very pleasing and novel ideas will be found inside, allowed by the introduction of wood. These comprise newel fittings, ceiling pendants, brackets, candle lamps, lanterns and in fact every pattern of fitting as now required for electric lighting, and as they can be made in various kinds of woods it is thus possible to work them in with the scheme of their surroundings. The tendency with wooden fittings is naturally to become heavy in design; but if this is avoided we should think that the new style will rapidly find favour.

Midget Arc Lamps.

The small-current arc lamp is making considerable headway, as instanced by the number of arc lamp makers who are adding these goods to their list of manufactures. A pattern recently introduced by the New Century Arc Lamp Co. is made in two sizes, namely, for 1 to 2½ ampères and 3 to 4 ampères, and will burn equally well on alternating or continuous-current circuits. The small size is suitable especially for living-rooms, &c., whilst the larger size can be used to advantage in shops, halls and public institutions. The cases are either enamelled or in bronzed copper with bright metal bands. The resistance is contained in the body of the lamp and does not interfere with the trimming of the carbons, which is easily effected by means of the simple globe-sealing device. The lamps are strongly constructed and so designed that all the parts can be easily got at.

Electric Deck Planers.

These machines, a good many of which are in use in the shipbuilding yards of the North, are made by Messrs. Mavor & Coulson, of Glasgow, and effect a remarkable saving over the cost of planing by hand. For instance, a carpenter, it is stated, will plane 45 sq. ft. in a day at a cost of 10s., but one of these machines will do 360 sq. ft. in one hour at a cost of 1s. If the working day be reckoned at eight hours, then the machine is 640 times as efficient as hand-labour. The cost of working is made up of 9d. per hour for one man who pushes the machine and 1½d. an hour for each two apprentices to pull the machine and sweep away the shavings. The machines are made for continuous and also for three-phase current, and are supplied with motors of about 3-h.p.

Point Switches.

The ordinary Tumbler switch, which has been in vogue for very many years, has always fulfilled a very useful duty; but nevertheless many have objected to it on artistic grounds, as it produces a protuberance on the wall, and even when countersunk it is not handsome. The "Button" switch which has just been introduced by the Edison and Swan Co. will meet the views of those referred to above, and in several other ways has distinct advantages over the Tumbler switch. It is provided with a push button (like an electric-bell push), and when countersunk behind an artistic metal plate the button need not even project as far as the surface. One push closes the circuit, the

next opens it, or *vice versa*. If the lamp is broken, then of course two consecutive pushes will produce no light. The switch is provided with the "wedge" movement; apart from its sightliness, it has the further advantages that it can be worked by one finger only, and that it cannot be tampered with in any way, as it is impossible to produce an arc, as with the Tumbler switches. The movement is most ingenious and is effected by a round-headed pin working in a cup-shape recess inside the push. The end of this pin falls into one or other of two slots in the bridge-piece when the push is depressed. It moves the bridge-piece over and then returns with the push, which works against a spring. On being depressed a second time it falls into the other slot, which has been moved over in the last operation, and returns the bridge-piece to its original position. Up to the present the only marketable push switch has been provided with two pushes, one for breaking and one for closing the circuit. A.M.I.E.E.

Builders' Notes.

Employment in the Building Trades during September continued dull, and was worse than a month and a year ago.

A Lift Contract.—Messrs. William Aug's Gibson, Ltd., of Temple Bar House, 28, Fleet Street, London, have been given the contract for the lifts at the new Shipping Exchange buildings in Cockspur Street, S.W.

London Building Act Amendment Bill.—The Building Act Committee of the London County Council hope to be in a position to submit amending proposals in time for a Bill to be introduced into Parliament in the session of 1905.

Belgian Lime.—The London County Council have passed over a tender for Belgian lime for main drainage works and accepted a higher tender for English lime. There was a difference of 2d. per ton in the price for 9,000 tons and of 9d. per ton for 14,800 tons.

Long Grove Asylum : Tender for £360,000 accepted.—The sum of £468,353 has been voted by the London County Council for the completion of the Long Grove Asylum, Epsom, and the tender of Messrs. Foster & Dicksee, of Rugby, amounting to £359,892 10s., for the erection of the superstructure has been accepted.

Master-Plumbers' Conference at Bradford.—The half-yearly conference of the National Association of Master-Plumbers of Great Britain and Ireland was held last week at Bradford under the chairmanship of the president, Mr. W. Jaffrey, of Manchester. The Association was initiated in Yorkshire about nine or ten years ago, and now has 1,400 members.

Water for Building Operations.—At Stockport last week Mr. James Crossley, a well-known local builder, was fined 20s. and costs for unlawfully taking water for mixing concrete at some houses he is building in Moorland Lane. The water was taken from the adjoining house by means of a pipe attached to the tap in the cellar and laid across to the new houses. Mr. Molyneux, the water engineer, said it was the practice for builders when erecting houses to make application for water and pay a deposit. A service pipe was then laid. Mr. Crossley was charged £2 16s., and if he had paid it or made an arrangement proceedings would not have been taken.

Ruberoid Roofing.—In the notice of this roofing on p. xiii of our issue for last week a slight error was made. The paragraph relating to the United States should have read that 2,636,000 sq. ft. of Ruberoid roofing are already in use in the Philippines, having

been purchased by the United States Government. Last year 53½ million sq. ft. of this roofing were sold in the States. Messrs. Robert W. Blackwell & Co., Ltd., of 59, City Road, E.C., are the manufacturers.

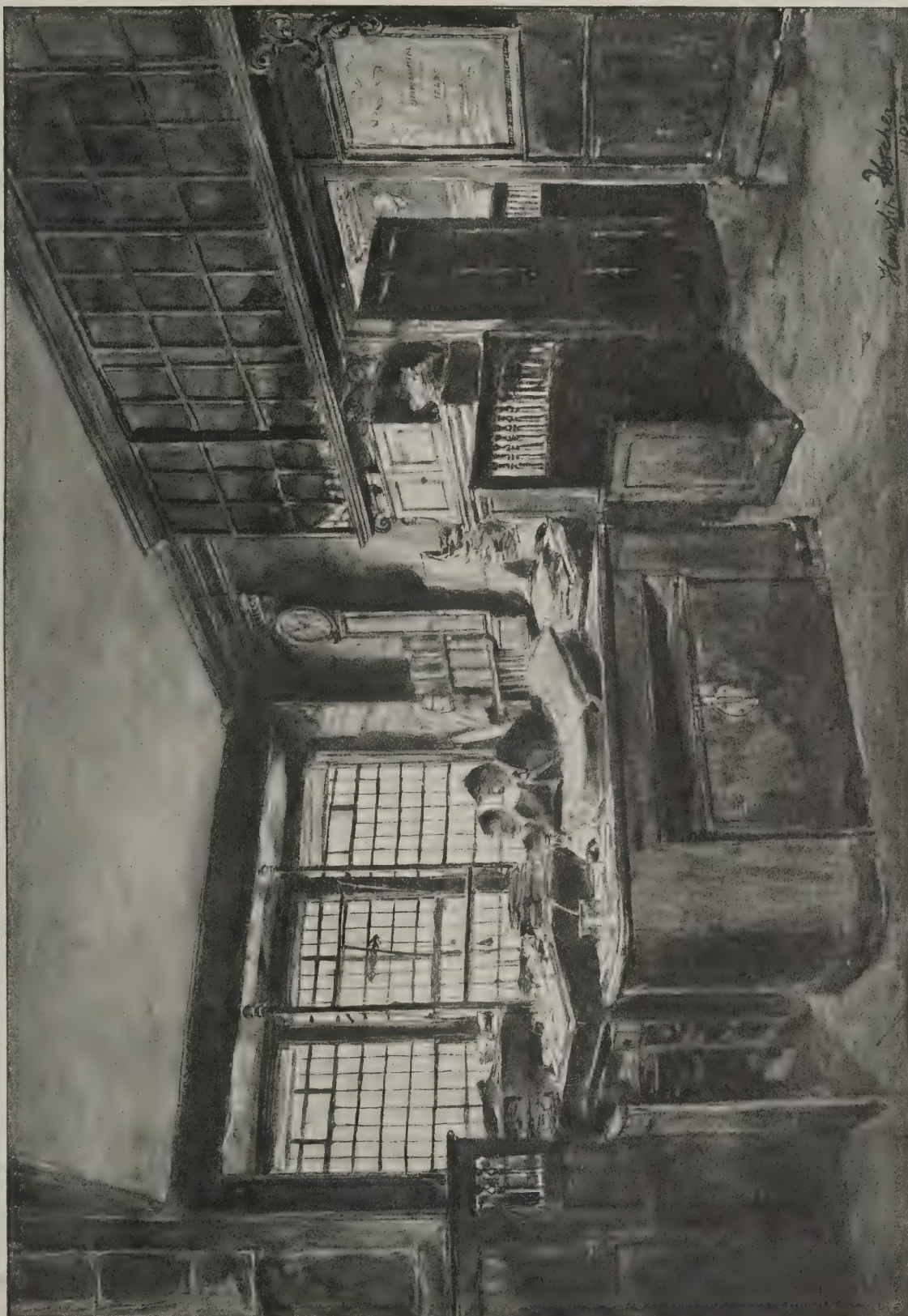
Hopton Wood Stone offered at Reduced Price.—Builders and masons using stone flagging will be interested to learn that Messrs. J. Hodson & Son, Ltd., the well-known general stone merchants, of Lenton Boulevard, Nottingham, are offering a large proportion of the extensive stock at their Hopton Wood quarries in order to make room for improvements. Sawed flags of this stone, far superior to that ordinarily used for flagging, paving, hearths, &c., are being sold at less than half the usual prices, and below those charged for ordinary York and other stone.

Demand for Roofing Tiles and Machinery in South Africa.—An increasing market is offered home manufacturers in the growing demand for roofing tiles in the building trade in South Africa, says "South Africa." A very large number of tiles are now manufactured there, and, despite the slackness reported in the building industry, the trade has lately been rapidly growing. The requirements for machinery for their manufacture to the sub-continent are therefore likely to expand for some time to come—a feature which well merits the attention of manufacturers concerned.

"The £150 Cottage."—At last week's meeting of the Chertsey Rural District Council, whose area comprises a large portion of West Surrey, the medical officer recommended that the by-laws should be altered so as to permit the erection in rural districts of cottages of iron or wood on brick foundations. A committee of representatives from various villages was appointed to suggest a revision of the by-laws, in order, if possible, to meet the case. A farmer representing Bisley said that to erect a cottage in conformity with the council's by-laws would mean an expenditure of about £230 and a consequent rent of 5s. or 6s. a week. In the village he represented, adjoining property held by the Earl of Onslow, and where Lady Pirbright owned a great deal, a young fellow who wanted to follow the occupation of an agricultural labourer, and wished to marry, would find it impossible to live in the village, for the simple reason that no cottage was obtainable.

Law Cases.

A Preposterous Summons.—At the Southwark Police Court last Wednesday Mr. Baggallay dismissed a summons taken out by the Bermondsey Borough Council against Mr. Henry Line, builder, of Peckham Rye, for failing to deposit a plan before partially reconstructing a drain at the Alma London County Council School, Bermondsey, contrary to the by-laws. The defendant said that he had done a considerable amount of work at the school, for which he had given the municipal authority the required plans. Just before the men left, the architect instructed them to put in a new gully in place of an old one, and a new pipe. The witness was away on his holidays at the time, and the men omitted to send a plan of this piece of additional work before beginning it.—Mr. Baggallay (to sanitary inspector): And do you say that another plan was required before this little extra piece of work was done?—Yes, under the by-laws.—Mr. Baggallay: This is the essence of municipal terrorism. Here is a man doing a lot of work, and plans for everything have been deposited. Because he puts in one pipe and one little gully you summon him for not giving another plan. The summons is dismissed; it is perfectly preposterous.



DRAWINGS OF ARCHITECTURE: THE COUNTING-HOUSE AT CHRIST'S HOSPITAL, NEWGATE STREET, LONDON, BY HANSLIP FLETCHER.

THE L.C.C. SCHOOL OF BUILDING.

THE London County Council, after having already done so much to provide efficient technical instruction in the building and allied trades, has now gone a step further and established a special school devoted exclusively to these trades. This school is situated in Ferndale Road, Brixton, a convenient and central position. The building is not a new one. It was erected for the purposes of a skating rink, and, when this craze died out, passed through various vicissitudes, being used in turn for a polytechnic and as public swimming-baths. It is therefore only to be expected that it is not quite suitable to its present purpose, but extensive additions and alterations have greatly improved it. The school was opened last session, but owing to the alterations not being finished in time, only a few elementary classes could be started, the number of students being 262. Now with its second session, which commenced on September 26th, the school is in full working order and adequate promise is already given of it being a great success. The L.C.C. has been fortunate in securing the services of Mr. H. W. Richards as principal of the school. Mr. Richards has been educating the building trades of London for twenty years and is one of the pioneers of technical education. Previous to undertaking the arduous work of establishing this new school, he was principal of the architectural department of the Northern Polytechnic, which he made so popular that more than a thousand building-trades students were receiving instruction, and more extensive accommodation had to be provided. Mr. Richards was highly respected by all his students at the Northern Polytechnic, and this faculty of appealing to their sensibilities brings out their best qualities and makes them enthusiastic workers.

The Brixton school has been established by the London County Council with the avowed object of enabling artisans and others engaged in the building and allied trades to acquire an intimate knowledge of the principles underlying the processes which they have to carry out in daily work. Drawing offices and classrooms, and workshops for carpentry and joinery, staircasing, hand-railing, brickwork, masonry, stone-carving, woodcarving, plasterers' work, plumbers' work, and painters' and decorators' work have been equipped at considerable cost. The workshops are so arranged that, while being more convenient, the conditions are similar to those met with on buildings and in builders' shops. Every facility is given for full-size work—a necessity in proper training—and when practicable the various trades will collaborate, for which purpose a portion of the large hall will be devoted. In this way Mr. Richards contemplates the erection of a small cottage, for which there is ample room. The idea is an extremely happy one, and will undoubtedly be greatly instructive in practical conditions, helping to overcome that isolation of the workman in specialized trades and that ignorance of allied trades which is such a bar to improvement.

The school is still not completely fitted up; the heating and electric lighting have yet to be done. We would suggest that these be somewhat elaborate and according to the latest practice, and so arranged that students of the school might find object-lessons and means for experiment in these important but often ignored or inadequately taught subjects.

The progress of the school this session is marked, the total entries to the present time being 515, an increase of 253 on last session. This is a good record in the circumstances, and the total will doubtless be considerably increased.

It is interesting to know which are the most popular subjects. First in importance is Building Construction with 202 entries, next Builders' Quantities with 95, then Carpentry and Joinery and Staircasing 90, Plumbing with 81 entries, Architecture with 25, and Land Surveying with 25.

The classes in building construction are taken by the principal, Mr. Richards, and his assistant, Mr. A. R. Sage, and in the Honours, Part II. stage by Mr. J. G. P. Meaden and Mr. W. Fretwell. In each of the four courses (arranged to suit the South Kensington examinations) the evening's work consists of a lecture, followed by students' drawing practice. The school is at present receiving its chief support from those practically engaged in the building trades rather than from the architectural profession, but it is to be expected that considerable support will be given in time to the classes in architectural drawing and design, and detail drawing, conducted by Mr. J. G. P. Meaden, and the classes on the history of architecture. Lectures on the mechanics of building, a subject increasingly appreciated and of fundamental importance, are given by Mr. A. R. Sage. The fact that classes are to be established in workshop arithmetic and practical mathematics emphasizes the deficiency in elemen-

tary education, which it is to be hoped will be repaired now that the London County Council has the matter in its hands. Elementary and secondary education should be more co-ordinated with technical education, and it would be well if parents were asked to decide what trade or profession they desired their children to enter, and a course of instruction laid out for them; the present slipshod method of most parents only produces incompetency, and swells the ranks of the unemployed and the criminal classes. Classes in geometrical drawing and practical plane and solid geometry are instructed by Mr. E. L. Bates. Lectures are to be given by Mr. A. E. Munby on the chemistry and physics of building materials—a subject of the utmost importance to all employed in the constructive trades and professions, concerning as it does the scientific use of materials and logical design. Mr. R. Crabb instructs in land surveying and levelling, and, together with the Principal, in builders' quantities. Lectures on builders' bookkeeping are given by Mr. O. F. T. Walford and on builders' estimating by Mr. J. H. Barns. The classes in carpentry and joinery and in staircasing and hand-railing are instructed by Mr. H. Barsby, practice in elaborately-fitted-up workshops being given in connection therewith. Mr. S. R. Cameron instructs in woodcarving,



DRAWINGS OF ARCHITECTURE: OLD STAIRCASE IN CITY MANSION, BOTOLPH LANE
BY HANSLIP FLETCHER.

Mr. C. Burgess (head of the architectural stone-carving department for Messrs. Farmer and Brindley) in stone-carving, Mr. J. Fitzgerald in brickwork, Mr. W. Burlington in masonry (an honours grade and setting-out class being wisely added), Mr. Channon in plasterers' work (another most efficient class), and Mr. C. W. Jewitt in plasterers' modelling and ornamental plasterwork; Mr. L. Drinkwater in painters' and decorators' work, and Mr. W. Fretwell and Mr. P. Knight in teachers' work; while a training class for learners is instructed by the Principal.

It will be seen from the foregoing that the school embraces a wide range of subjects, which will be further extended when support is forthcoming. The instruction is quite on the right lines, and the school will doubtless become the chief centre for the building trades of London. The instructors are all practical, some being in the employ of large and well-known London builders. Combining under one roof all branches of knowledge connected with building, it offers unrivalled capacity for the instruction of students, and as the endeavour is made by the Principal to make them all-round men fitted to take foremost positions of trust, such as building inspectors, clerks of works, foremen and superintendents, &c., it has our unqualified support. If the architectural profession and its societies also assist in popularizing the school, it will bring that necessary association with practical work which is so greatly needed for the improvement of present-day architecture. We are glad to hear that the large builders are helping the school in various ways, and we suggest that inestimable advantage would follow the adoption of some such scheme as that of the various engineering works at Darlington, where the managers send their engineer apprentices to evening and day preparatory classes at the local technical college, while one or two firms grant extra pay to those who obtain certificates. It is a matter for reproach that whereas New York started its building school, known as the "Trades Training School," twenty years ago, and now instructs about 5,000 students annually, we have had to wait so long before a similar school was established in London. The fees at Brixton are low, being 10s. per session, including admission to all classes, while apprentices, improvers and learners under twenty-one years of age are admitted free.

OUR PLATES.

AN interior perspective of Mr. Nicholson's design for Liverpool Cathedral was given in our issue for October 5th.—The county hall at Northallerton is now being erected by Messrs. J. Howe & Co., of West Hartlepool. It is faced with red Leicestershire bricks and Hollington stone, with light-green Westmoreland slates on the roofs. A feature is made of the hall and grand staircase leading to the council chamber. Mr. Brierley's design was selected in a limited competition held ten years ago. The drawing was in this year's Academy.

DRAWINGS OF ARCHITECTURE.

THIS week we give two of Mr. Hanslip Fletcher's drawings. These are careful examples of his brush work, but do not call for any special comment. We would draw attention, however, to the manner in which the details of the counting-house at Christ's Hospital are rendered, the treatment of the window and the delineation of the papers, books, &c., being particularly good. In regard to the drawing on the opposite page it should be mentioned that Mr. Fletcher has not made any error in showing the plaster partition which cuts so awkwardly across the ceiling. This is as it exists.

Obituary.

The late Mr. Thomas Lea, builder, of Crewe, who died on August 2nd, left estate which has been valued at £5,102 gross.

Mr. William Moorhouse, builder, of Clapton, who died on July 2nd last, aged 77 years, left estate of the gross value of £19,674.

Coming Events.

Wednesday, October 19.

ARCHITECTURAL ASSOCIATION (Camera and Cycling Club).—Mr. G. H. Smith on "Canterbury Cathedral," at 7.30 p.m.

SANITARY INSTITUTE (Lectures and Demonstrations for Sanitary Officers, Part I.).—Mr. J. W. Clarke on "Details of Plumber's Work," at 7 p.m. Inspection and Demonstration in the District of Islington at 2 p.m., conducted by Mr. J. R. Leggatt.

INSTITUTE OF BUILDERS.—Annual Dinner, Whitehall Rooms, Hotel Metropole, Charing Cross, at 6.30 p.m.

INSTITUTE OF SANITARY ENGINEERS.—Election Committee, 3 p.m. General Purposes and Finance Committee, 5 p.m.

BUILDERS' FOREMEN AND CLERKS OF WORKS INSTITUTION.—Quarterly Meeting of the Members at 8 p.m.

Thursday, October 20.

CARPENTERS' COMPANY (Lectures on Sanitary Building Construction).—Mr. H. D. Searles-Wood on "Construction of Water-closets," &c., at 7.30 p.m.

SOCIETY OF ARCHITECTS.—Twentieth Annual General Meeting at Staple Inn Buildings (South), Holborn, W.C., at 8 p.m.

Friday, October 21.

GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Professor Gourlay, B.Sc., A.R.I.B.A., on "The Architecture of Berlin," at 8 p.m.

INSTITUTE OF MECHANICAL ENGINEERS.—Ordinary Meeting at 8 p.m.

SANITARY INSTITUTE (Lectures and Demonstrations for Sanitary Officers, Part I.).—Mr. A. Saxon Snell on "Building Materials," at 7 p.m.

Saturday, October 22.

JUNIOR INSTITUTION OF ENGINEERS.—Visit to Messrs. Stuart's Granolithic Stone Works, Glengall Road, Millwall Dock, at 3 p.m.

SANITARY INSTITUTE (Lectures and Demonstrations for Sanitary Officers, Part I.).—Inspection and Demonstration at Charing Cross Hospital New Buildings, at 2.15 p.m., conducted by Mr. A. Saxon Snell, F.R.I.B.A.

Monday, October 24.

SANITARY INSTITUTE (Lectures and Demonstrations for Sanitary Officers, Part I.).—Mr. A. Saxon Snell on "Sanitary Building Construction and Planning," &c., at 7 p.m.

Wednesday, October 26.

SANITARY INSTITUTE (Lectures and Demonstrations for Sanitary Officers, Part I.).—Mr. A. Saxon Snell on "Ventilation, Warming and Lighting," at 7 p.m.

Thursday, October 27.

ARCHITECTURAL ASSOCIATION.—Conversation at 18, Tufon Street, Westminster, at 8 p.m.

Saturday, October 29.

JUNIOR INSTITUTION OF ENGINEERS.—Visit to the National Physical Laboratory, Bushey House, Teddington, at 3 p.m.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending October 14th twenty-six failures in the building and timber trades in England and Wales were gazetted.

C. HAWES, builder, Crouch End. R.O., Oct. 7th.

E. WILSON, builder, Croydon. Adj. Sept. 24th.

S. T. COPPOCK, builder, Maidenhead. P.E., Town Hall, Windsor, Nov. 12th, at 11.

HODGSON & BIRD, builders, Birkenhead. R.O. Oct. 7th.

E. OXLEY, architect and surveyor, Clay Cross. P.E., Chesterfield C.C., Oct. 21st, at 2.

J. J. NICOLLS & SONS, builders and contractors, Forest Hill. R.O., Oct. 5th.

G. SPURR, builder, Whitley Bay. P.E., Newcastle-on-Tyne C.C., Nov. 10th, at 11.

E. SALTMARSH, builder, Chelmsford. Liabilities £4,053; assets £210; deficiency £3,843.

F. KENDALL, builder, Walsall. Gross liabilities £4,111; £2,258 expected to rank for dividend.

E. R. JEVONS, builder and contractor, Birkenhead. Liabilities £6,762; assets £353; deficiency £6,409.

T. PRIEST, brick manufacturer, Dudley. First meeting, O.R.'s, Dudley, Oct. 19th, at 11. P.E., Dudley C.C., Oct. 20th, at 11.

G. F. BLACKBURN, builder and contractor, Hull. First meeting, O.R.'s, Hull, Oct. 19th, at 11. P.E., Hull C.C., Oct. 24th, at 2.

C. CAMPBELL, painter and decorator, Hull. R.O. Oct. 5th. First meeting, O.R.'s, Hull, Oct. 19th, at 12. P.E., Hull C.C., Oct. 24th, at 2.

R. TAYLOR, painter and decorator, Bradford. R.O. Oct. 5th. First meeting, O.R.'s, Bradford, Oct. 19th, at 3.30. P.E., Bradford C.C., Nov. 16th, at 10.

A. GREENAWAY, builder, Exmouth. Gross liabilities £3,426; £245 expected to rank for dividend; assets £8; deficiency £165.

T. WILKINSON (B. Cook & Co.), contractor for public works, Westminster. Failure attributed to heavy loss on Scarborough sea-wall contract owing to storms and bad weather. Liabilities £52,000; assets £43,000.

C. L. WHITEMAN, builder, Bexhill. Liabilities £17,059; assets £3,009. Failure attributed to "difficulty in realizing property, loss on purchase of the engineering business (at St. Leonard's), and losses in such business."

Current Market Prices.

FORAGE.		£	s.	d.	£	s.	d.
Beans	per qr.	1	14	0	2	0	c
Clover, best	per load	3	15	0	4	2	c
Hay, good	do.	3	10	0	3	15	0
Sainfoin mixture	do.	3	10	0	3	17	6
Straw	do.	1	12	0	2	0	0

OILS AND PAINTS.		£	s.	d.	£	s.	d.
Castor Oil, French	per cwt.	1	0	5	—	—	—
Colza Oil, English	do.	1	2	3	—	—	—
Copperas	per ton	2	0	0	—	—	—
Lard Oil	per cwt.	2	15	0	2	17	0

Lead, white, ground, carbonate	per ton	16	0	0	—	—	—
Do. red	do.	15	0	0	—	—	—
Linseed Oil, barrels	per cwt.	0	15	10	—	—	—
Petroleum, American	per gal.	0	0	5 1/2	0	0	5 1/2
Do. Russian	do.	0	0	5 1/2	0	0	5 1/2
Pitch	per barrel	0	7	6	—	—	—
Shellac, orange	per cwt.	10	2	0	—	—	—
Soda, crystals	per ton	3	2	6	3	5	0
Tallow, Town	per cwt.	1	6	0	—	—	—
Tar, Stockholm	per barrel	1	2	9	—	—	—
Turpentine	per cwt.	1	19	0	—	—	—

METALS.

Copper, sheet, strong	per ton	74	0	0	—	—	—
Iron, Staffs., bar	do.	5	15	0	8	0	0
Do. Galvanized Corrugated sheet	do.	10	5	0	10	10	c
Lead, pig, Soft Foreign	do.	12	3	9	—	—	—
Do. do. English common brands	do.	12	7	6	12	10	0
Do. sheet English, 3lb. per sq. ft. and upwards	do.	14	0	0	—	—	—
Do. pipe	do.	15	0	0	—	—	—
Nails, cut clasp, 3in. to 6in.	do.	9	5	0	—	—	—
Do. floor brads	do.	9	0	0	—	—	—
Steel, Staffs., Girders and Angles	do.	5	15	0	6	5	0
Do. do. Mild bars	do.	6	0	0	6	5	0
Tin, Foreign	do.	130	15	6	131	5	0
Do. English ingots	do.	132	0	0	132	10	0
Zinc, sheets, Silesian	do.	25	2	6	—	—	—
Do. do. Vienne Montaigne	do.	25	10	0	—	—	—
Do. Spelter	do.	22	17	6	23	10	0

TIMBER.

SOFT WOODS.		£	s.	d.	£	s.	d.
Fir, Dantzic and Memel	per load	2	10	0	4	17	6
Pine, Quebec, Yellow	do.	4	0	0	7	0	0
Do. Pitch, American	do.	2	9	0	5	15	0
Laths, log, Dantzic	per cu. fath.	4	0	0	6	0	0
Deals, Söderhamm, Yell., 4th, 4x9	per std.	10	5	0	10	15	0
Do. Marieberg, Yellow, 5th, 2 1/2 x 7	do.	7	5	0	—	—	—
Do. Kopmanholmen, Yellow and White, 3x9	do.	5	15	0	—	—	—
Do. Omega, Yellow, 3rd, 3x9	do.	10	15	0	11	0	0
Do. St. Petersburg, Yellow, 3rd, 3x11	do.	7	10	0	—	—	—
Do. do. do. 3x9	do.	8	10	0	—	—	—
Do. Archangel, Yellow, 3rd, 3x11	do.	9	10	0	9	15	0
Do. do. do. do. 3x9	do.	10	5	0	10	10	0
Do. do. do. 4th, 3x11	do.	7	0	0	7	5	0
Do. do. do. do. 3x9	do.	8	10	0	—	—	—
Do. do. do. 5th, 3x11	do.	5	10	0	5	15	0
Do. do. do. do. 3x9	do.	6	15	0	7	0	0
Do. Quebec, Spruce, 3rd, 3x9	do.	8	15	0	—	—	—
Do. do. Bright Pine, 4th, 3x9	do.	8	10	0	—	—	—
Do. Bay Verte, Spruce, Unsorted, 3x8	do.	6	10	0	—	—	—
Do. do. do. 3x7	do.	6	5	0	—	—	—
Do. Lewisport, Bright Pine, 4th, 3x11	do.	8	15	0	—	—	—
Battens, all kinds	do.	5	15	0	8	15	0
Flooring Boards in. pre-							
pared, 1st...	per square	0	10	0	0	11	0
Do. 2nd	do.	0	8	0	0	10	3
Do. 3rd, &c.	do.	0	7	3	0	9	3

HARD WOODS.		£	s.	d.	£	s.	d.
Ash, Quebec	per load	4	5	0	7	0	0
Birch, Quebec	do.	2	15	0	5	15	0
Box, Turkey	per ton	8	0	0	20	0	0
Cedar, Cuba	per ft. sup.	0	0	3 1/2	—	—	—
Do. Honduras	do.	0	0	3	—	—	—
Do. Tobasco	do.	0	0	4 1/2	—	—	—
Elm, Quebec	per load	4	10	0	8	0	0

Mahogany, Average Price for Cargo, Honduras	per ft. sup.	0	4	1 1/2	—	—	—
Do. African	do.	0	0	3 1/2	—	—	—
Do. St. Domingo	do.	0	0	3 1/2	—	—	—
Do. Cuba	do.	0	0	4 1/2	—	—	—
Do. Lagos	do.	0	0	2 1/2	—	—	—
Do. Benin	do.	0	0	2 1/2	—	—	—
Do. Tobasco	do.	0	0	3 1/2	—	—	—
Oak, Wainscot	per log	2	15	0	5	5	0
Do. Dantzic & Stettin	per load	3	0	0	6	10	c
Do. Quebec	do.	5	0	0	7	15	0
Teak, Rangoon, planks	do.	8	0	0	15	10	0
Do. Indian logs	do.	10	0	0	18	0	0
Do. Indian planks	do.	12	10	0	20	0	0
Do. Moulmein logs	do.	6	10	0	8	0	0

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Oct. 20	Devonport—Valve House	Corporation... ..	Stevenson & Burstal, 38 Parliament Street, Westminster, S.W.
" 20	London, E.—Laundry Building	Guardians	J. Rider, Hunt & Co., Bridge House, 181 Queen Victoria Street, E.C.
" 21	Bolton-upon-Dearne, Yorks—Restoration of Tower	Guardians	George Dickinson, Westholme, Bolton-upon-Dearne.
" 20	Stepney—Erection of New Laundry Building	Guardians	J. R. Hunt & Co., 181 Queen Victoria Street, E.C.
" 21	St. George-in-the-East—Repairs to Roof, &c.	Guardians	J. R. Brown, Clerk's Office, Raine Street, Old Gravel Lane, E.
" 21	Brandon Colliery, near Durham—Chapel	Commissioners	H. T. Gradon, Architect, Durham.
" 21	London, S.W.—Sorting Office	Gas Committee	H.M. Office of Works, &c., Storey's Gate, S.W.
" 21	Manchester—Gasometer Depot	Norfolk Education Committee... ..	City Architect, Town Hall, Manchester.
" 21	Manchester—Additions to Colthall Schools	Norfolk Education Committee... ..	A. J. Scott, Architect and Surveyor, 24 Castle Meadow, Norwich.
" 21	Norwich—Additions to Swanton Abbot Schools	Commissioners	A. J. Scott, Architect and Surveyor, 24 Castle Meadow, Norwich.
" 21	Cockburnspath, Berwick—Coastguard Buildings	County Local Education Authority.	Superintending Engineer, H.M. Naval Establishment, Rosyth, Inver-
" 21	Streatham—Sorting Office... ..	County Local Education Authority.	keithing, N.B.
" 22	Merthyr Vale, Wales—Erection of Schoolroom, &c.	County Local Education Authority.	Secretary, H.M. Office of Works, &c., Storey's Gate, S.W.
" 22	Isle of Wight—Additions, &c., to Chapel	County Local Education Authority.	Rev. W. Andrews, Wesley Terrace, Merthyr Vale.
" 22	Aberystwyth—Additions &c., to Workhouse	Guardians	County Surveyor's Office, 5 St. Thomas's Street, Ryde.
" 22	Ince, near Wigan—Alterations, &c. to Council Offices	Urban District Council	Union Workhouse, Aberystwyth.
" 22	Gravesend—Public Library	Town Council	A. T. Swain, New Council Offices, Ince Green Lane, Ince.
" 24	Maidstone—Steam-Roller Houses, &c.... ..	Roads and Bridges Committee	E. J. Bennett, 191 Parrock Street, Gravesend.
" 24	Gillingham, Kent—Corrugated Iron Shed	Corporation... ..	County Surveyor, West Borough Chambers, Maidstone.
" 25	Pontypridd—Twenty-eight Houses	Freehold Land and Building Co.	F. C. Boucher, Town Clerk, Gillingham.
" 25	London—Bricks	London County Council... ..	T. R. Philipps, Architect, Old Bank Chambers, Pontypridd.
" 25	Aberbeeg—Twenty Houses	Building Club	Superintending Architect's Department, 18 Charing Cross Road, W.C.
" 25	Southwark—Museum Buildings	Borough Council	John Rowlands, Secretary, Glynced, Llanhilleth, Mon.
" 26	Lambeth—Engineer's Workshop, &c.	Guardians	A. Harrison, Engineer, Town Hall, Walworth Road, S.E.
" 26	Aldershot—Post-Office	Commissioners	W. Thurnall, Guardians Offices, Brook Street, Kennington Road, S.F.
" 27	Farnborough—Post-Office	Commissioners	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 28	Ashford, Kent—Mortuary	Urban District Council	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 28	Penynglyn, Wales—School	Rhondda U.D.C.	W. Terrill, Surveyor, North Street, Ashford.
" 28	Rhondda—School	Urban District Council	Jacob Rees, Hillside Cottage, Pentre.
" 31	Wallasey—Public Offices	Urban District Council	J. Rees, Hillside Cottage, Pentre.
" 31	Larkhall—New Station Buildings	Caledonian Railway Company... ..	H. W. Cook, Public Offices, Egremont, Cheshire
" 31	Great Berkhamstead—Erection of School	Managers of the Maintained Schools.	Company's Engineer, Buchanan Street Station, Glasgow.
Nov. 1	Troedryhiw, Wales—Renovation of Church	Commissioners of H.M. Works and Public Buildings.	C. H. & N. A. Rew, 185 High Street, Great Berkhamstead.
" 1	Croydon—Sorting Office	Urban District Council	William Tyley, 16 Tydfil Terrace, Troedryhiw.
" 2	Litherland, Lancs—Decoration, Repair, &c., of House	Urban District Council	Secretary, H.M. Office of Works, Storey's Gate, London, S.W.
" 5	Swanage—Construction of Wall	Urban District Council	A. H. Carter, Surveyor, 25 Sefton Road, Litherland.
No date	Conisborough—Residence... ..	Wesleyan Minister	T. Randall, Town Hall, Swanage.
"	Harrogate—House	Park View Building Club	H. L. Smethurst, Architect, Conisborough.
"	Pontnewydd, near Newport, Mon.—Erection of Twenty Houses.		J. Ellis Marten, Prince's Chambers, Harrogate.
ENGINEERING:			
Oct. 20	Coatbridge, N.B.—Bridge Widening	Town Council	Swallow & Havard, Architects and Surveyors, Dock Street, New
" 20	London—Hydrant Indicator Tablets	L.C.C.	port, Mon.
" 20	Thurleston, Sheffield—Heating	Building Committee	Simpson & Wilson, 175 Hope Street, Glasgow.
" 20	Swansea—Boiler	Harbour Trustees	Clerk to Council, County Hall, Spring Gardens, S.W.
" 21	London, N.—Electric Lighting	Tottenham U.D.C.	J. M. Greaves, Townend House, Thurlstone, Penistone.
" 21	London, E.C.—Engine-shed Roofs	Burma Railways Co., Ltd.	A. O. Schenk, Harbour Offices, Swansea.
" 21	Manchester—Steel Structures	Gas Committee	E. Crowne, Clerk, 712 High Road, Tottenham.
" 21	London, N.—Electric Lighting	Tottenham U.D.C.	Burma Railways Co., 76 Gresham House, Old Broad Street, E.C.
" 22	Bamford, near Sheffield—Valves, &c.	River Committee	City Architect, Town Hall, Manchester.
" 22	Truro—Sea Wall	W. London Extension Co., Ltd.	E. Crown, Clerk, 712 High Road, Tottenham.
" 22	Bahia, Brazil—Railway	Corporation	E. Sandeman, Engineer's Office, Bamford, near Sheffield.
" 24	London, S.W.—Subway	Guardians	Measham Lee, City Surveyor, Truro.
" 24	Ipswich—Meters	West London Extension Rail-	Secretary of Agriculture, Bahia, Brazil.
" 24	Bishop's Stortford—Boiler	way Company.	Engineer, Paddington (G.W.R.) Station.
" 24	London, S.W.—Subway	Corporation... ..	Frank Aytton, Chief Engineer to Corporation, Ipswich.
" 25	Middleton—Boiler	Corporation... ..	Alfred G. Gungun, Clerk, Bishop's Stortford.
" 25	Middleton, Lancs—Dust Destructor	Corporation... ..	Engineer's Office.
" 25	Southend-on-Sea—Refuse Destructor	Guardians	Frederick Entwistle, Town Clerk, Middleton.
" 27	Richmond, Surrey—Telephones	Corporation... ..	Frederick Entwistle, Town Clerk, Middleton.
" 28	Sunderland—Generators	Corporation... ..	E. J. Elford, M.I.M.E., Borough Engineer, Southend-on-Sea.
IRON AND STEEL:			
Oct. 20	London—Iron Indicator Tablets... ..	County Council	P. Umney, Clerk to Guardians, Union Chambers, Richmond, Surrey.
" 21	Londonderry—Pipes	Committee of Management, Dis-	John F. C. Snell, Town Hall, Sunderland.
" 26	Newcastle-on-Tyne—Iron Pens	trict Lunatic Asylum.	Clerk to Council, County Hall, Spring Gardens, S.W.
" 27	Chatham—Fencing	Markets Committee	M. A. Robinson, C.E., Richmond Street, Londonderry.
Nov. 2	Watford—Pipes	Corporation	City Architect, Town Hall, Newcastle-on-Tyne.
PAINTING AND PLUMBING:			
Oct. 20	Leeds—Painting, &c., Walls, Windows, &c.	Miners' Institute	Charles Day, Borough Surveyor, Town Hall, Chatham.
" 24	Newry—Painting of Town Hall	Urban District Council	Engineer, Council Offices, 14 High Street, Watford.
ROADS AND CARTAGE:			
Oct. 20	Greenwich—Road Works	Borough Council	Caretaker, Miners' Institute, York Road, Leeds.
" 20	Southend-on-Sea—Making-up Streets	Corporation... ..	Borough Surveyor, Town Hall, Newry.
" 21	Bishop's Stortford—Granite, &c.	Urban District Council	Borough Engineer and Surveyor's Office, Town Hall, Greenwich
" 22	Truro—Steam-rolling	Rural District Council	Road, S.E.
" 22	Wrotham, Kent—Steam-rolling	Urban District Council	E. J. Elford, Borough Surveyor, Southend-on-Sea.
" 22	Levenshulme—Street Works	Bedwelty U.D.C.	T. Swatheridge, Clerk, Council Offices, North Street, Bishop's
" 22	Pengam, Wales—Road	Rural District Council	Stortford.
" 22	New Shoreham, Sussex—Street Works	Rural District Council	J. Retallack, Surveyor, Ventongimps, Callestick, R.S.O. (for North
" 24	Romford—Granite	Corporation... ..	Division); and J. P. Carbis, Surveyor, Ruan High Lanes, Gram-
" 24	Gillingham, Kent—Road Materials	Urban District Council	pound Road, Truro (for South Division).
" 25	Erdington, Birmingham—Stone	Urban District Council	A. J. H. Powell, Surveyor to Council, Borough Green.
" 26	Ware, Herts—Granite	Urban District Council	James Jepson, Guardian Chambers, Tiviot Dale, Stockport.
" 26	St. Anne's-on-Sea—Street Works	Urban District Council	J. H. Lewis, Surveyor, Blackwood, Mon.
No date	Oswestry—Street, &c.	Urban District Council	George W. Warr, Surveyor, Council Offices, Southwick.
SANITARY:			
Oct. 20	Greenwich—Sewer, &c.	Borough Council	George Lapwood, Highway Surveyor, Victoria Chambers, Romford.
" 21	Ashby-de-la-Zouch—Sewers	Rural District Council	Corporation Offices, Gillingham, Kent.
" 21	Larne, Ireland—Sewerage Works	Rural District Council	H. H. Humphries, Surveyor, Public Hall, Erdington.
" 25	Gillingham, Kent—Drain Pipes, &c.	Corporation... ..	G. H. Gisby, Clerk, Ware, Herts.
" 25	Great Sutton, Cheshire—Sewers... ..	Urban District Council	The Surveyor, South Drive, St. Anne's-on-Sea, Lancs.
" 25	Battle, Sussex—Sewers, &c.	Urban District Council	Shayler & Ridge, Surveyors, Oswestry.
Nov. 5	Pontllyn—Road and Drains	Urban District Council	Borough Engineer's Office, Town Hall, Greenwich Road, S.E.
"			S. Turner, Surveyor, Avenue Road, Ashby-de-la-Zouch.
"			J. W. Whiteford, Engineer, 28 Waring Street, Belfast.
"			Corporation Offices, Gillingham.
"			F. E. Priest, 13 Harrington Street, Liverpool.
"			Alfred Dray, Engineer, Town Hall Chambers, Hastings.
"			Gustard & Waddington, Solicitors, Tredegar Chambers, Bridge Street,
"			Newport, Mon.

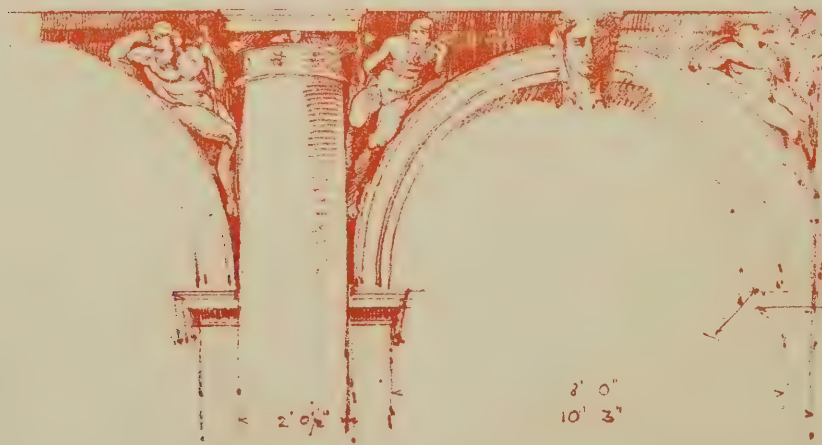
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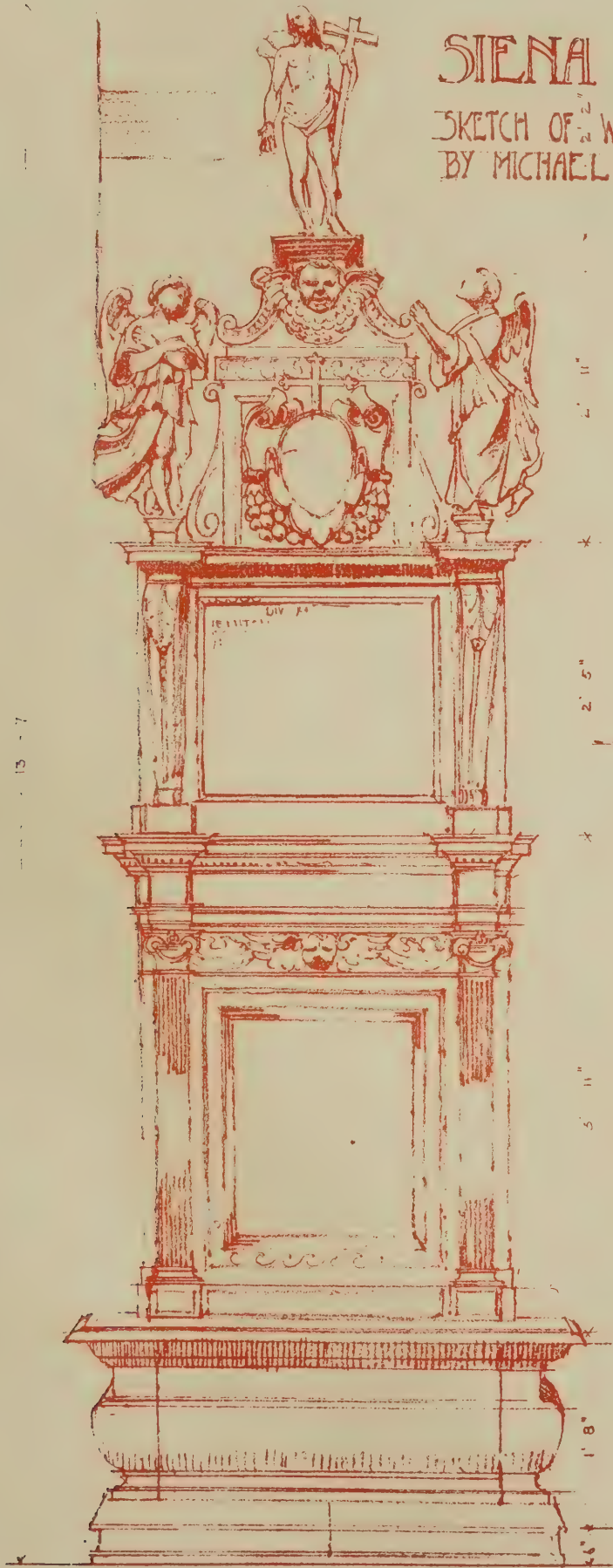


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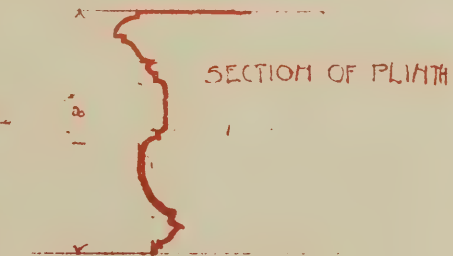
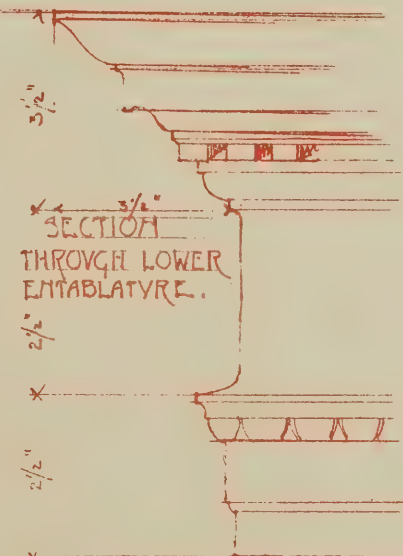
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SIENA CATHEDRAL

SKETCH OF WALL-TABLET DESIGNED
BY MICHAEL-ANGELO.



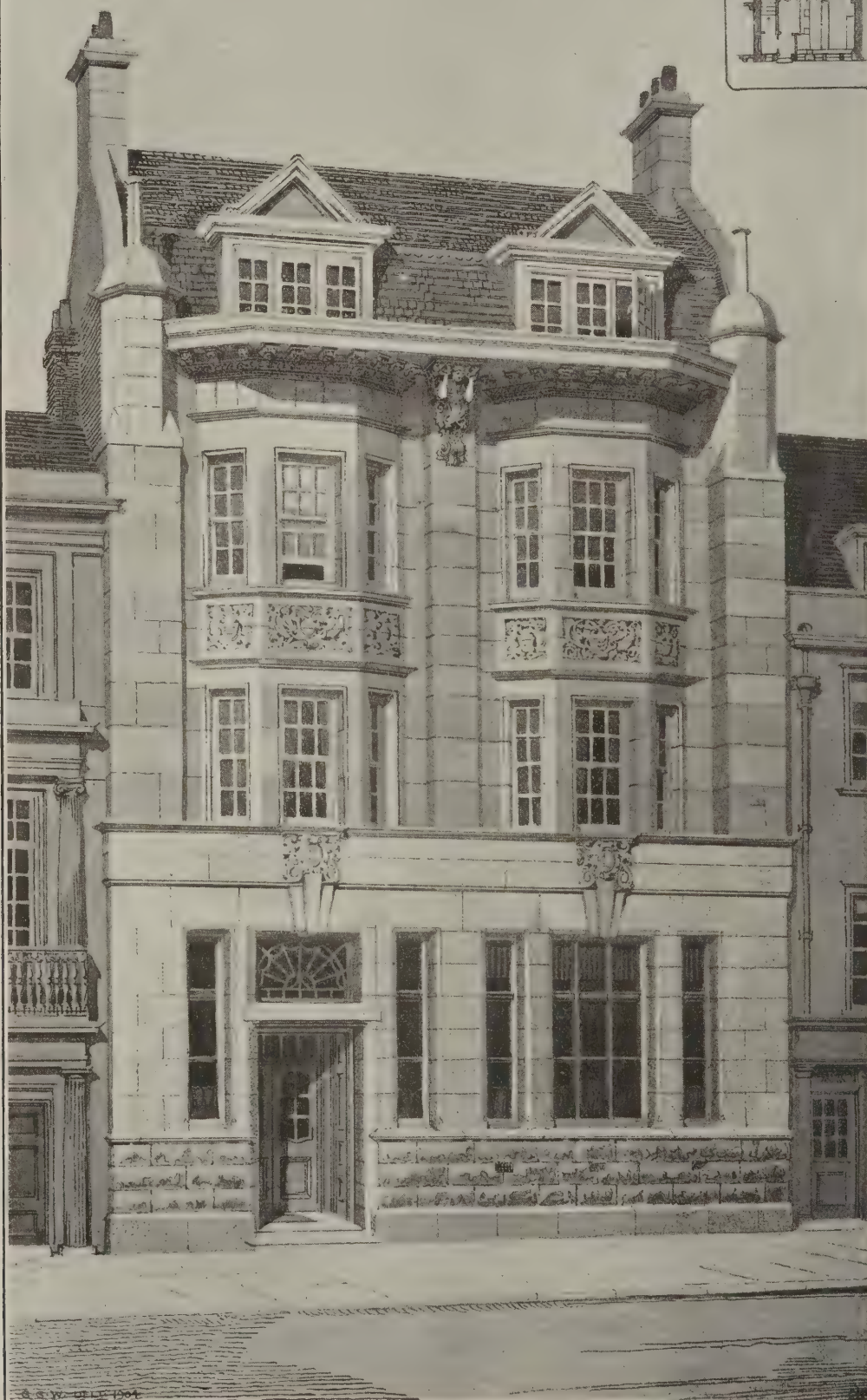
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WAREHOUSE, GREAT CHARLES STREET, BIRMINGHAM. W. H. BIDLAKE, ARCHITECT.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

October 26, 1904. Vol. 20, No 507.

6, Great New Street, Fetter Lane, E.C.

Summary.

At the London Coliseum now being completed in St. Martin's Lane there is a remarkable circular stage divided into three concentric rings, the outer of which will revolve at 25 miles an hour. The proscenium, 55ft. wide by 40ft. high, is the largest in the United Kingdom; by means of tormentors it can be brought back to the usual 42ft. width, while a sliding proscenium border-frame reduces it to 40ft. by 25ft. The house has three tiers and will seat 3,000 people. Messrs. Frank Matcham & Co., the architects, have employed this patent gridiron construction for the tiers: this consists of a semi-circular main girder with radiating supporting girders, instead of the ordinary cantilevered straight main girder. In this gridiron construction there are 80 tons of steel. The tiers are supported by two solid steel columns, the concrete foundation being reinforced by steel grillage. (Page 218.)

An International Fire Library is being formed by the British Fire Prevention Committee. It comprises 3,000 volumes at present. (Page 220.)

The Council of the Society of Architects has adopted a waiting and watching policy in regard to architects' registration in order to see how the R.I.B.A. will proceed. For the first time a lady has been registered a student of the Society. (Page 222.)

There are many different formulæ for finding the strength of cast-iron columns. Hodgkinson's is perhaps the most reliable, but is cumbersome to use. Gordon's formula is handier and applicable to other purposes. A factor of safety of 10 is usual with this formula for dead loads. (Page 226.)

Further improvements at Balmoral Castle are to be carried out under the direction of Sir Rowand Anderson, who had an audience of His Majesty three weeks ago, when the plans were discussed. (Page 224.)

Messrs. Waring & Gillow sent out to the St. Louis Exhibition what was practically a whole country-house, with structure, decorations, furniture, &c., complete in every detail, and erected it as an object-lesson in English industrial art. They have been rewarded by securing two grand prizes for both decoration and furniture and two gold medals for upholstery and sanitation. (Page 221.)

The first prize of 20 guineas in the "Uralite" competition for original designs or practical suggestions for fixing this material has been awarded jointly to Mr. Mr. Alfred E. Sidford, M.S.A., of Wokingham, and Mr. Murray Spry. (Page 224.)

An answer to "What is a central courtyard?" is given on p. 225. For the Soane design we think a courtyard entirely enclosed by the palace rooms is meant.

Scamps in the New York Building Trade.

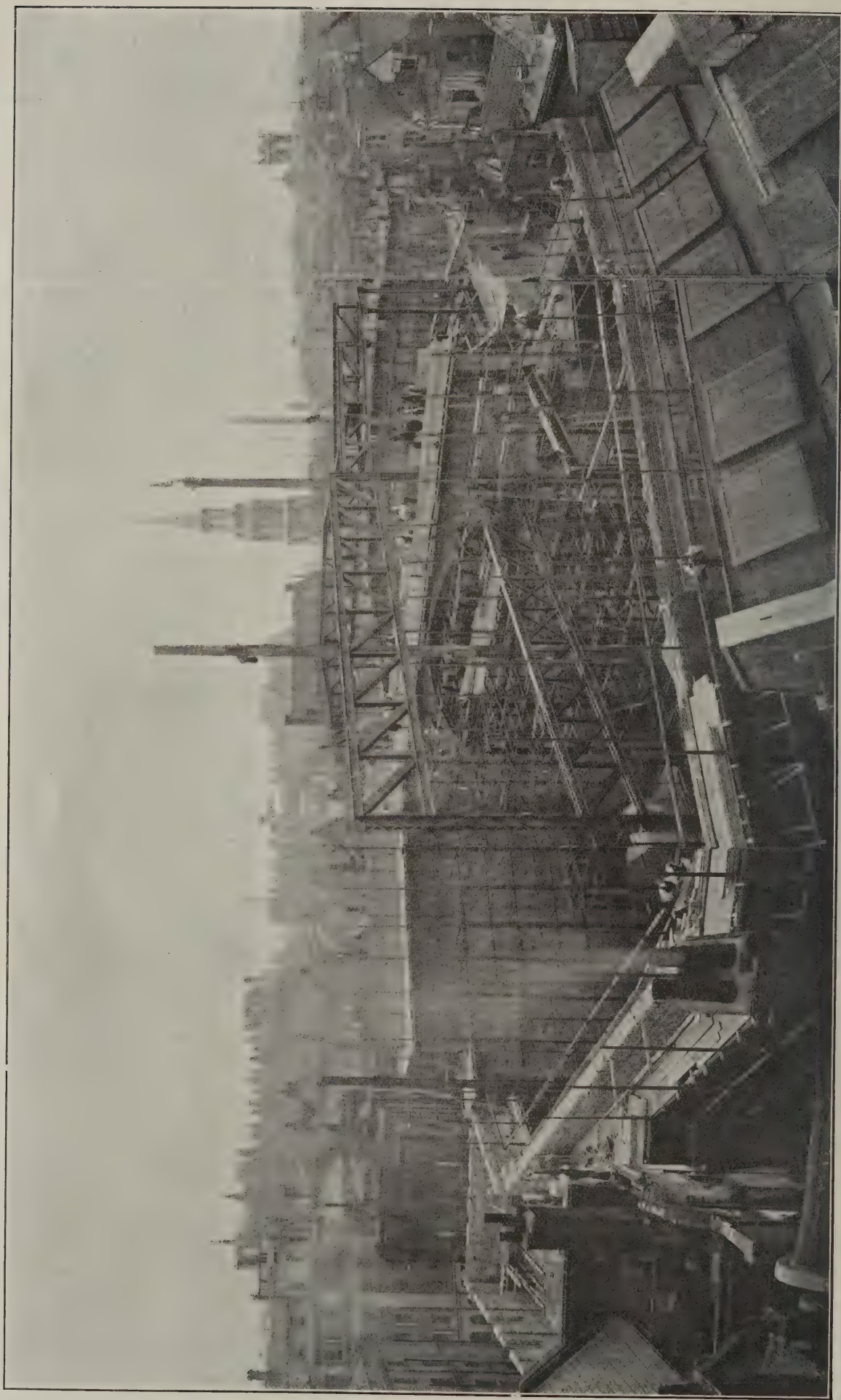
THE New York labour leaders cannot evade their nemesis. The notorious Sam Parks exercised vast power for a time and held the employers at bay, but his latter end was an utter disgrace. Last summer he was found guilty of extortion, and quite recently he died in prison. Of the after development of the unions in New York and the deplorable strikes which are doing so much harm throughout the United States a concise account was given in our issue for September 21st. To the facts there presented we have now to add others. It will be remembered that the fighting Board into which the several unions were gathered by their unscrupulous delegates had to give way before the masters' association, and Parks was dethroned. But things were not allowed to rest. Soon another combination of the unions was formed under the title of the Building Trades' Alliance, headed by a new leader named Weinseimer, whose chief object was to get rid of the arbitration agreement. In our issue for September 28th we reported that this aggressive association had likewise been swept away by the masters, and now comes the news that Weinseimer has been found guilty of blackmail and extortion and will be sentenced this week. The whole story is one of dishonour among thieves. There is no burking the fact that labour matters in New York are conducted disgracefully, being in the hands of men who are absolute rogues. No honest man could undertake such work: the third leader the workmen have had within a year happened to be honest and he resigned his post in disgust. American trade and business seems to be permeated with a spirit of fraud and neglect, as illustrated by this strike in New York, by the criminal negligence which brought about the terrible calamity at the Iroquois Theatre, Chicago, and by the "General Slocum" disaster; and, moreover, the scamps who are responsible—and even arraigned for their offences—manage to go scot-free. There are plenty of liars and rogues in London, but not so many as in New York, and we at least see that their punishments are carried out.

WE are constantly hearing of **Open Tenders.** complaints by contractors about architects not accepting the lowest tender. This commonly happens when the chosen contractor is only a few pounds above the lowest and is known to architect and client, having given satisfaction on former jobs. But when reliable firms are passed over in this way it must be considered unfair,

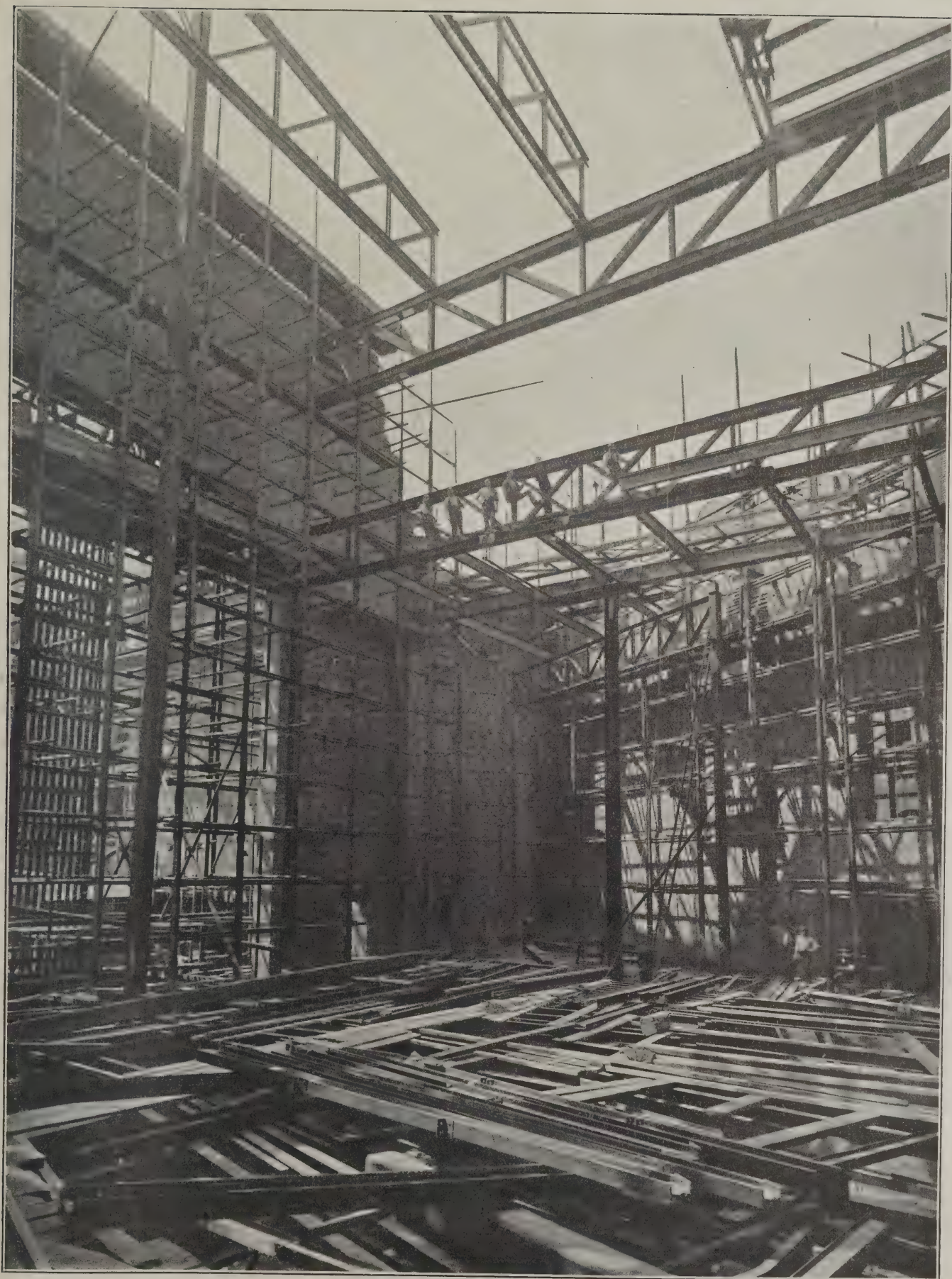
for a contractor incurs considerable expense in tendering and should be recouped if he is passed over. The tendency amongst architects to do this has been growing in recent years; also, much work is now put up to tender among a selected number of builders, and work is often given out without competition, either to a lump sum contract or 10 per cent. profit on the nett cost, the books being open to inspection. Builders generally have neglected to take any means to obviate this chance of unfavourable treatment of themselves. They do not advertise notable works they have recently executed that will themselves speak for their competency, and it cannot be wondered that architects wanting this knowledge and knowing how many incompetent and cheating builders there are, should give the work into the hands of those they can trust. There is only one remedy for this and that is to advertise in a journal which reaches every architect of standing in the kingdom. To afford this opportunity we shall publish a monthly directory of builders in which will be given their addresses, telephone numbers and names, together with illustrations of works recently executed by them, besides other data. This has already awakened the interest of contractors throughout the country, who are giving us their cordial support. Full particulars may be obtained free on application.

A project of Imperial Interest.

THE proposed connection of the railway system of Western Australia with that of South Australia is a project of Imperial interest. Except for the slender thread of the telegraph line, the West, comprising one-third of the Australian continent, is entirely without land communication with her sister States. The distance between Fremantle, the chief port of Western Australia, and Adelaide, the capital of South Australia, by overland route is 1,746 miles. Fremantle and Kalgoorlie in the former state, and Port Augusta and Adelaide in the latter, being already connected by rail, 1,100 miles between Kalgoorlie and Port Augusta remain to be spanned by the iron road. The cost is likely to be five millions sterling. One of the difficulties to be overcome would undoubtedly be that of water-supply, though there seem to be good prospects of obtaining the necessary quantities by boring. As an alternative, pumping from Kalgoorlie through pipes laid along the line is suggested, while another method proposed is to erect covered tanks at suitable intervals along the route, with artificial catchments for rainfall.



THE LONDON COLISEUM: WORK AS EXECUTED UP TO MAY 5TH, 1904. FRANK MATCHAM & CO., ARCHITECTS.



THE LONDON COLISEUM: THE STAGE, LOOKING TOWARDS THE SCENERY DOCK AND AUDITORIUM.
DREW-BEAR, PERKS & CO., LTD. CONSTRUCTIONAL ENGINEERS.

THE LONDON COLISEUM.

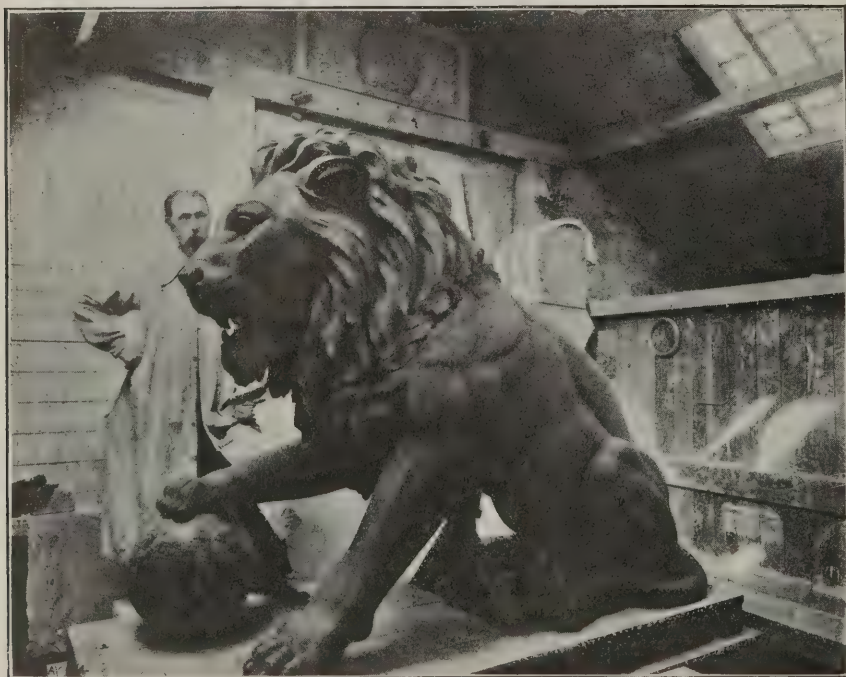
THIS building, now being completed in St. Martin's Lane, Charing Cross, London, is a work of considerable magnitude, covering $1\frac{1}{4}$ acres of ground. We publish this week a number of views showing it in course of construction, and in other issues we shall follow with views of numerous other details. Not more than two years will have been spent in erecting this huge theatre. The work was commenced in 1903 by the demolition of the old buildings on the site. This was a difficult task because, with the object of saving time, it is the custom of Messrs. Frank Matcham & Co., the architects, to begin the demolition of the old buildings and the erection of the new several months before all the leases of the properties on the site have expired. By dint of persuasion, however, and monetary inducement, the tenants of this property off St. Martin's Lane were induced to leave, the building operations being suspended when the tenants held out, and the premises shored up. This is very worrying work, but the saving of time and the consequent interest on capital makes it profitable. On the Coliseum site 120 different interests were involved.

The site is bounded by St. Martin's Lane at the front, Bedfordbury at the back, Taylor's Buildings (a court behind Chandos Street) and May's Buildings. Several historic buildings were destroyed to make way for the new theatre, including Charles Buildings and Turner's Court, but much of the property consisted of slums, there being as many as ten or twelve families in some of the houses.

The Coliseum Co., of which Mr. Oswald Stoll is the managing director, began by employing labour direct, without the intervention of a contractor, under the management of Mr. John F. Revell, the clerk of works, who has now been engaged on theatres under Mr. Frank Matcham for a number of years. Mr. Revell started the laying of bricks in December, 1903, and the work was solely in his hands up till May last, the state of the building at that time being shown by the photograph on p. 216. In short, the Company built the foundations and main buildings up to the roof, laying 5,000,000 bricks, when the rest of the work was put up to tender, and the contract secured by Messrs. Patman & Fotheringham, Ltd. (Mr. James F. Parker,



FRONT TO ST. MARTIN'S LANE.



ONE OF THE FOUR LIONS TO BE PLACED ABOVE THE TOWER BALUSTRADE.

managing director), the well-known builders of 100 and 102, Theobald's Road, London, W.C., and Park Street, Islington, N., who themselves have laid between $1\frac{1}{2}$ and 2 million bricks. These figures show roughly the size of the job. Mr. Revell cleared 28,000 yds. of material for the stage foundation bed, which is 32ft. below the level of Bedfordbury, and the sinking of the large well (as it may be called) in which the revolving stage is placed.

The method adopted in carrying out this work is noteworthy. First the ground was trenched for the ring wall, which is 28ft. deep and 6ft. 6ins. at the bottom, tapering to $2\frac{1}{2}$ bricks at the top, and concreted for half the depth. Engines were then placed on the ring wall, the earth in the centre being removed by their agency, and the solid concrete bed 9ft. thick by 75ft. diameter constructed. On this bed there are twenty-five different electric motors which will propel the revolving stage. This latter is built in three concentric rings each 25ft. across, which can either revolve independently (the outer one at 25 miles an hour), or be coupled together in any order, or turned as one whole. This stage is to be used for spectacles, horse-racing, &c., and for saving time in setting scenes; while a scene is facing the audience on one-half of the stage another can be set at the back on the other half. This stage will have cost £12,000.

It is covered with zin. teak and padded with felt to reduce vibration to a minimum. It was designed by Mr. E. Wingfield Bowles, and constructed by Messrs. Ransomes & Rapier, Ltd., of Ipswich and London. Several other arrangements have been adopted for saving time in staging, the main conditions of the design of the theatre being the provision of a two-hours continuous entertainment without the usual waits of 10 to 15 minutes between the scenes. Thus, over the stage there is a girder on each side on which will run a goliath electric crane capable of picking up a piece of scenery or anything else weighing 10 tons.

All the engineering work of the stage portion, apart from the stage itself, was constructed by Messrs. Drew-Bear, Perks & Co., Ltd., of the Battersea Steel Works, Wellington Road, S.W., and 71A, Queen Victoria Street, E.C. The views we publish show their work in course of construction and give some idea of the immense size of this portion of the building. The impressiveness of the place may be realized if we imagine entering a room 100ft. square and 70ft. high, for there is nothing between the stage and the grid, which is 71ft.—and the roof 81ft.—above the floor. The stage is free from any obstruction with the exception of two stanchions at the back which pick up the flies, grid and roofs over. We shall deal at greater length with Messrs. Drew-Bear, Perks & Co.'s work in a later issue, when detail illustrations of the steelwork will be given. We would mention that it was delivered built up to a large size and that a 90ft. derrick was used in erecting it.

The foundation bed for the revolving stage was intended to be inclined, as it was thought that the wheels would need to run as on a bicycle track, but on being worked out it was found that the centrifugal action of the circular stage was balanced and consequently

level). The main walls of the stage had naturally to be carried down to the same level as the foundations of this interior work. They are laid throughout in cement, and grouted up. Fletton bricks were used. The walls go down to the London clay and are 3ft. thick at the base, with a foundation spread of 6ft. 6ins. Not much water was encountered, only hand pumping being necessary.

There are also dressing-rooms at the back with the latest appliances, including a spray-bath for ladies and another for gentlemen,



TERRA-COTTA SHIELD ON TOWER.

as well as a green-room of course. On the O.P. side is a large triangular scene dock.

The auditorium is designed to seat 3,000 persons, comfort being studied rather than the accommodation of a large number. The main entrances to all parts of the house are in St. Martin's Lane. There are three distinct exits from each floor outside the main walls of the building. There are three tiers—called the grand tier, the dress circle and the amphitheatre. The whole of the ground floor is devoted to stalls and boxes.

The structural engineering to this portion of the building has been executed by Messrs. Richard Moreland & Son, of Old Street, E.C. The tiers are carried by a novel form of construction, the patent of Messrs. Matcham & Co., the architects. This is shown in the photographs on pp. 222 and 223. It will be seen to consist of a main circular girder, with girders radiating from it. This kind of "gridiron" is not a cantilever construction, the whole stability depending upon the gusset plates (similar to those seen on the top side) riveted under the ends of the radial girders where they join the main girder. Cantilevers are run out beyond the main girders, two of which are shown in the view on p. 222, but these are subsidiary. The advantage of this construction is that the ceiling is regular, not being upset as by the usual straight girder. The total length of main girder is 129ft. 6ins.; it has a clear span, being only supported close to the walls by solid steel columns, 88ft. from centre to centre. The weight of the main grid construction shown is 80 tons.

The solid steel columns referred to are a speciality of Messrs. Moreland, and have obvious advantages over the hollow column, as to the smallness of their diameter and resistance to fire. The diameters of the columns here used are 10ins. on the ground floor, 9ins. on tier above, 8ins. above that, and 7ins. at the top. The cap to each column is 4ins. solid steel. The foundation to each column is a concrete-steel grillage 120ft. super. in extent; consisting of four 12in. by 6in. joists, held in place by two plates riveted over, and on top of this three joists crossing. The concrete is 9ft. thick. On the grillage is a 6ft. by 6ft. by $\frac{3}{4}$ in. plate, and then a solid

steel plate 4ins. thick. Messrs. Moreland used derricks (to be seen in the views on pp. 222 and 223) and pneumatic riveters, the compressor being driven by an electric motor.

The dome over the centre of the auditorium is a special steel structure of novel design. It is 22ft. in diameter and nearly 70ft. in circumference, constructed on the principle of the "hit and miss" ventilator, so that one-half can be opened direct to the outside air, or closed up at will. Its circumference is divided into sixteen parts, eight of which are filled in with painted glass (see p. 221). These eight parts are stationary, the remainder being constructed of steel plates of a special make on a light steel frame, made to turn on their axis, and so forming a revolving dome similar to that of an observatory. The glazed fixed portion of the dome has a base ring made up of light angles and plates of steel, the radial ribs, of which there are sixteen in this portion, being firmly riveted to this ring. They are curved to a true radius and intersect at the crown into a specially-designed steel head. The ribs are connected together with circumferential ribs of steel tees, arranged to support and form the glazing bars for the glass panels. On the outside of the steel ring supporting the stationary portion of the dome a circular track is formed and firmly riveted in place, acting as a roller path for the base of the steel-plated portion of the dome. This base has a series of wheels working on steel pins in gunmetal bearings socketed to the radial ribs. The loads are carefully regulated and distributed over the wheels by an adjustable steel pin at the crown in gunmetal bearings, so that friction is reduced to a minimum. The thrust of the radial ribs is taken up by a steel channel ring riveted to their bases. When the dome is properly adjusted two men by pulling on this ring can easily revolve it: a rack, however, is fixed to the channel ring, having a small pinion working in it,



FIGURE OF MUSIC ON TOWER.

a flat bed was substituted. Below this foundation is a subway 8ft. 6ins. high, 4ft. wide in the clear, constructed with brown-glazed bricks. It is entered by an iron spiral staircase in a great central hole 12ft. in diameter, and leads out of the ring back to the dressing-rooms, so as to allow the artists to get off the stage while the other rings are revolving. Under this foundation bed is also a sump for catching surplus water. Under the stage floor are tanks for aquatic spectacles, and a storage tank 22ft. by 18ft. by 11ft. deep holding 20,000 gallons still further below (35ft. in all below street

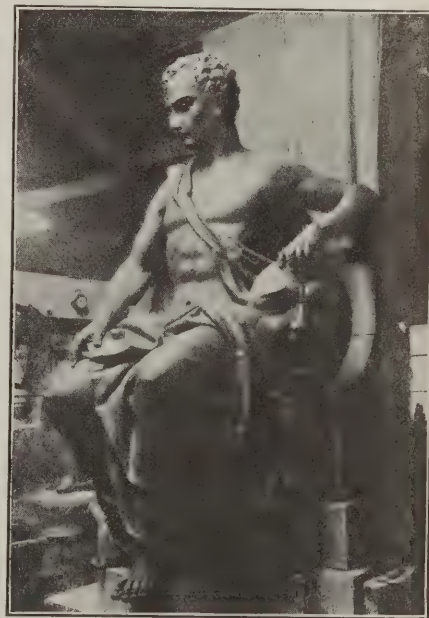


FIGURE OF DRAMA ON TOWER.

so framed and geared that one man with trifling effort can open or close the apertures in a few seconds. The working out of the details of this dome and its construction and erection was entrusted by the architects to Messrs. William Whitford & Co., an old-established firm of structural engineers, of the West Ferry Road, Millwall, E.

We publish photographs of some of the terra-cotta work. The colour is warm drab and the surface dragged rough. It was supplied by the Hathern Station Brick and Terra Cotta Co., Ltd., of Loughborough. We shall notice it further in another article.

MODERN DECORATION.

A PAPER on this subject was read by Mr. G. H. Morton before the Liverpool Architectural Society last week. He pointed out that it was not confined to one particular style, but had many phases and included at least three main characteristics. First, that based on the styles of the eighteenth century under the name of Queen Anne, Georgian and Adam; secondly, that of the so-called modern English school; and thirdly, the Early Victorian or naturalistic. Mr. Morton argued that so long as eighteenth-century furniture was so eagerly sought after, the decorations of that period would be required, and he pointed out the increasing tendency to adopt contemporaneous French decorations. In regard to modern English design Mr. Morton said that it had so frequently been carried to excess and developed in many cases such eccentricities as to make it conspicuous even to vulgarity. So much was this the case that it caused a reaction which brought a revival of its opposite in the realistic representation of flowers and other objects peculiar to the decoration of about fifty years ago, and not inaptly named Early Victorian. Mr. Morton referred at some length to the importance of colour in decoration, and pointed out that colour was not only an aesthetic gratification but a physical necessity, and should be studied scientifically. The excess of one brilliant colour, especially red, was injurious to the eyes, and an overpowering quantity of white was also undesirable because it gave the retina no rest. In conclusion, Mr. Morton

said that modern English decoration was original, quaint and picturesque; it took into account the capabilities and nature of the materials it employed; it was not extravagant, but suited to the requirements of most of us; and if kept within proper limits should prove most suitable to the present day.

Builders' Notes.

Ripolin paints have been awarded the gold medal at the St. Louis Exhibition.

Contract for New Bridge at Sunderland.—The North-Eastern Railway Co. have accepted the contract of Sir William Arroll & Co., Ltd., of Glasgow, for the construction of the new bridge over the River Wear at Sunderland.

Tender for Carnegie Library, Walsall.—The Walsall Town Council have accepted the tender of Messrs. H. Wilcock & Co., of Wolverhampton, amounting to £7,534, for the Carnegie free library to be erected in Lichfield Street. Mr. J. S. Gibson, of London, is the architect. He is also the architect of the new town hall being erected at Walsall.

Yorkshire Building Trade Employers' Federation.—The monthly meeting of the Council was held at Hull last Thursday, Mr. E. Good (Hull), president, occupying the chair. After the business had been disposed of, an interesting ceremony took place in the banquetting chamber of the town hall, where the Mayor of Hull placed around the neck of the president a gold chain, which henceforth

is to form the badge of that office. Each link of the chain is a gift from a past-president, while the medallion has been presented by the president himself.

At the Llanelly Hospital, which rendered such good service in connection with the recent railway accident, Messrs. Hendry & Patisson (successors to D. O. Boyd), Oxford Street, London, have installed their latest "Hygiastic" ward stove service.

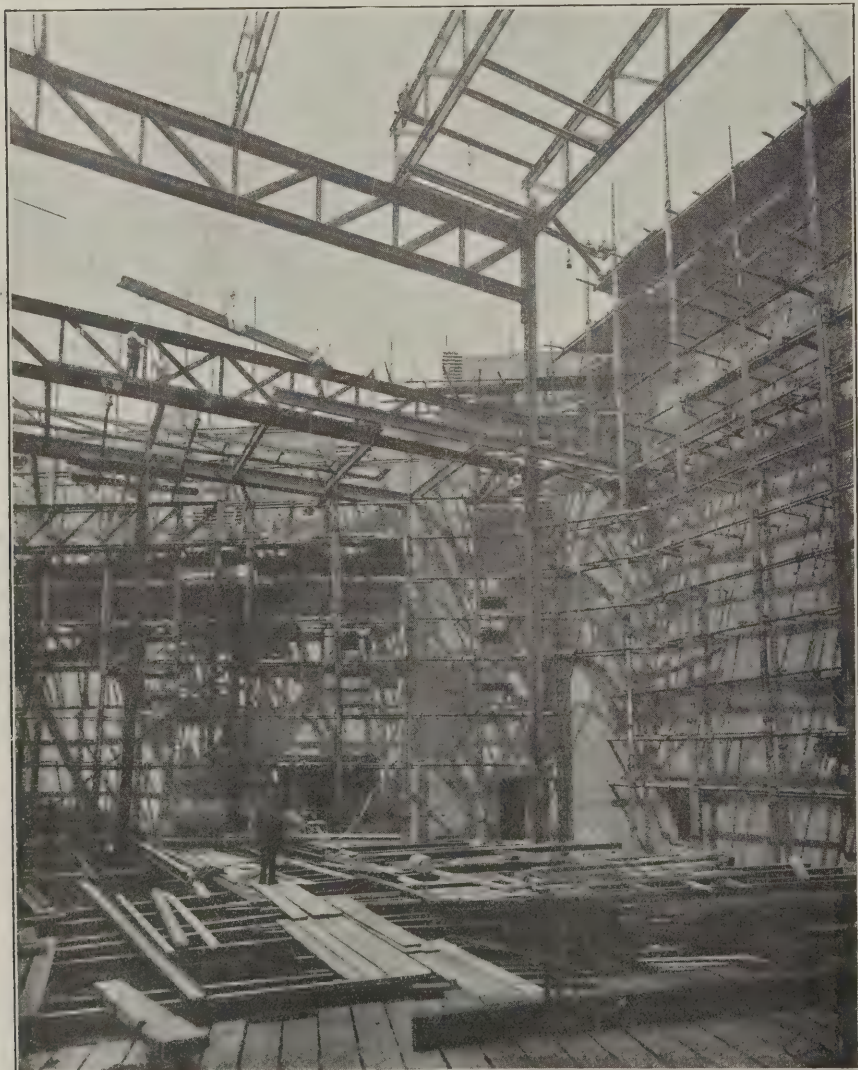
Presentation.—The Tees-side and District Master-Builders' Association has presented a gold watch and chain, together with a purse of gold, to Mr. W. C. Creasor, secretary of the Association and also of the Stockton Master-Builders' Association, on the occasion of his marriage.

The New Old Bailey. After two years' work the court-floor level of the new sessions house in Old Bailey has been reached, and the construction of the four courts will now be proceeded with as speedily as possible. In the archway over the main entrance to the building in the Old Bailey it is estimated that 100 tons of stone have been used.

Portable Building Co.—On October 14th, at Blackpool, Mr. E. J. Reed offered as a going concern the Fylde Steam Joinery Works, better known as the Portable Building Co. Bidding commenced at £1,000 and went very slowly to £1,400, at which figure it was withdrawn, the auctioneer announcing that, failing to sell the concern in one lot, it would be sold piecemeal in the course of a few weeks.

Tender for Outfall Sewer at Plumstead.—The recommendation of the Main Drainage Committee that the tender of the Westminster Construction Co., amounting to £81,285, be accepted for the construction of a portion of the new southern outfall sewer at Plumstead, has been referred back, by reason of the fact that the lowest tender sent in was £68,377. The committee's reason for not accepting this latter was that the firm had not as yet done any sewer construction work for the London County Council. At last week's meeting Colonel Rotton said that if they were not to accept the lowest tender they might as well do away with open competition altogether.

The British Fire Prevention Committee's work for the winter session, which has just commenced, includes the preparation and issue of an important report on the great Baltimore conflagration. Further reports will be issued on various tests with sprinklers, lamps and different forms of partitions. A report is also to be issued regarding the special commission's journey in Central Europe. The competition in respect to the children's fable closes on October 31st, and will be dealt with during the winter. An arrangement has been arrived at with the National Fire Protection Association of the United States by which members of the Committee are eligible as members of the American Association, and vice versa. About twenty American professional men have already joined the Committee. Arrangements are also being made for the organization of branches of the Committee in Canada, Australia and New Zealand. The Committee will assist in the preparation of the International Technical Dictionary which is being issued by the German Institution of Engineers as far as technical terms regarding fire-prevention are concerned. It has been decided that the library which is being formed by the Committee shall be henceforth known as the International Fire Library, and it will be managed on somewhat independent lines by the following library sub-committee, namely:—Messrs. James Sheppard, A.I.E.E. (chairman), Percy Collins, Charles E. Goad, M.A.I.C.E., Ellis Marsland, Edwin O. Sachs, F.R.S.Ed., and Mr. E. de Segundo, M.I.M.E. The number of individual volumes in the library already exceeds 3,000.



THE LONDON COLISEUM: VIEW OF THE STAGE, SHOWING FLIES AND BACK WALL.



THE LONDON COLISEUM: ROOF AND DOME OVER THE AUDITORIUM.

Correspondence.

The Teaching of Building Construction.

To the Editor of THE BUILDERS' JOURNAL.

LONDON.

SIR,—Your editorial note in last week's issue on "An Experiment in Teaching Design" is somewhat misleading. The method in question is by no means new. It is a form of teaching that has been impossible in schools under the control of the late Science and Art Department and in those under the City and Guilds, or those in receipt of grants from the L.C.C.; but fifteen years ago I commenced teaching advanced building construction and design on these lines at King's College, London, and have passed more than 600 students through this class alone. Many of the former students are now teachers in the various polytechnics and schools that have sprung up since these classes were started. The method of teaching at King's College is as follows:—The various sections of a building are grouped under heads, such as "Foundations," "Brickwork," "Masonry," "Carpentry," &c. Each section is dealt with fully by lecture, and all the variations likely to be met with in office work are explained with the aid of special diagrams and lantern slides. Each section takes three to four evenings. At the same time every evening a fresh question in drawing, design and construction is given, the question being placed on the blackboard with sketches and the main dimensions figured in. Finished drawings of similar questions are put up to explain and show how such a detail should be prepared. Each student works out the question as he considers best, keeping to the dimensions given, and his work is completed ready for examination and correction by me, or by my assistant Mr. D. A. Ross, in the following week, and then completed at home by the student. The lectures explain fully the requirements of the Building Acts and the strength and quality of the various materials. I may add that the exceptional success of

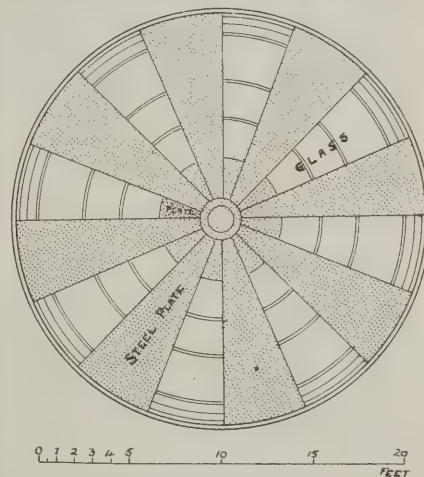
many of my former pupils confirms my belief in the method as being the best. Further, despite the fact that no public display of the work executed in these classes has been given for some years, and that the fees are higher than those of University College, the Polytechnics and the L.C.C. School of Building, the attendance at the classes maintains a healthy growth. Professor Simpson's so-called experiment is so much like my own method (which has till now stood alone) that I must ask you in fairness to King's College to find room for these remarks in your columns.—Yours truly,

J. BARTLETT.

[In reply to the foregoing Professor F. M. Simpson says: "The class which I have started at University College, London, and to which you refer in your paper, is on the same lines as one which I started in Liverpool University some years back. So far as I can judge from Mr. Bartlett's letter, his methods and mine are not identical, although I am glad to see they are somewhat similar. I supply the students with plans and skeleton elevation of one particular building (which apparently Mr. Bartlett does not do), and the student during the term makes a complete set of working drawings of that building. By this means he is able to understand the connection between its different parts."]

ENGLISH DECORATION AT THE WORLD'S FAIR.

IN securing two grand prizes for both decoration and furniture, and two gold medals for upholstery and sanitation, at the St. Louis Exhibition, Messrs. Waring & Gillow have achieved even greater success than at the Paris Exposition of 1900, when they were also awarded two Grand Prix for decoration and furniture. It was a great enterprise to send out to America what was practically a whole country-house, with structure, decorations, furniture, &c., complete in every detail, and to have it erected and displayed in the exhibition as an object-lesson in English industrial art. The cost



PLAN OF THE DOME.

must have been considerable and the risks of such a journey not by any means insignificant. The result, however, has justified the trouble. Not only has the exhibit been a revelation to the American public in its union of taste with comfort, but it has won the cordial appreciation of the more expert judges who had to make the official awards. It will be remembered that the exhibit consists of a suite of country-house rooms arranged on the ground floor of a quaint and interesting pavilion, including hall, dining-, drawing- and morning-rooms, billiard-room, a Sheraton bedroom, an old English bedroom and a nursery. Most of these are decorated in English styles, but the distinctive feature which makes them so attractive is undoubtedly the homelike character which Messrs. Waring & Gillow have succeeded in giving to their very artistic work. These are not mere showrooms; they are rooms to live in, and every detail of ornament and colour is subordinate to the general scheme of comfort. Considering the importance of the exhibition, Messrs. Waring & Gillow have been warmly congratulated on their achievement.



THE LONDON COLISEUM: GRAND TIER CONSTRUCTION. RICHARD MORELAND AND SON LTD., ENGINEERS.

THE SOCIETY OF ARCHITECTS.

Annual Report: Election of Officers.

THE twentieth annual general meeting of the Society of Architects was held on Thursday evening at Staple Inn Buildings (South), Holborn, the chair being occupied by the president, Mr. Walter Thomas.

Messrs. E. H. Ballan (Doncaster), S. E. Cook (Tientsin, China), A. A. Hunt (Sudbury), T. I. Moore (Harrogate) and A. J. Slater (Ipswich) were elected members of the Society and Mr. V. J. Walker (Ealing) a student. The annual report of the Council was received.

This stated that during the past twelve months the number of applications for membership had been above the average, resulting in the addition of fifty-three names to the roll. There had been four deaths—Colonel Ellison and Mr. Trevail, past presidents, Mr. Quartermain, hon. treasurer, and Mr. W. Cooper, one of the Board of Examiners.

The Council had nominated Mr. B. R. Tucker to the vacant hon. treasurer'ship and co-opted Mr. Curry, of Jersey, to be a member of council in place of the late Mr. Cooper. Another honorary office had been created, that of hon. librarian, to which Mr. R. G. Bare had been appointed.

The Students' Register

now included nearly sixty names, and to avoid the necessity of a studentship lapsing before the student was of the required age to qualify for full membership, the age limit had been raised to twenty-eight years, but this regulation did not prevent the student taking advantage of the entrance examination before reaching the new age limit. Two competi-

tions had been held, a prize of the value of three guineas being offered in each case. Mr. J. Stewardson (Carlisle) was the successful competitor for a design for an automobile club house and Mr. A. H. Weeks (Bristol) for measured drawings of a lych-gate.

After referring to the Society's new premises, where a reading-room and library has been provided on the second floor, reference was made to

Registration.

The past twelve months had witnessed an agreeable change in the attitude of the R.I.B.A. towards this subject, and the Council of the Society, for the present, had adopted a waiting and watching policy in order to ascertain whether the senior architectural body would proceed with the question to which it was now practically pledged.

In the meantime the Registration Bill promoted by the Society had been carefully revised and again placed in charge of Mr. Atherley-Jones, K.C., M.P.; being set down for second reading in June last, but owing to its position in the ballot was not reached. It was, however, satisfactory to find that the measure was gaining the approval of many members of Parliament.

Last December a deputation from the Society visited Manchester at the invitation of the Manchester Society of Architects, where Mr. Ellis Marsland read a paper on registration, with most satisfactory results. The Society had every reason to be satisfied with the progress which had been made and with the present position of affairs.

Ancient Lights

and the case of *Colls v. Home and Colonial Stores, Ltd.*, were next referred to in the report; and then the Society's examinations.

The number of candidates had been double that of last year, and for the first time since its institution the gold medal of the Society had been secured, the winner being Mr. W. D. Jenkins, of Llandilo. Mr. Frank Macey had been appointed examiner in Section III., Subject C, in the place of Mr. Jennings, resigned; and owing to the death of Mr. Cooper, who was the examiner in Section II., Subject B, the duties had been allotted to Prof. Henry Adams, with whom the former was associated in the work.

Scale of Charges.

The Council had given careful and prolonged consideration to the suggestion that the Society should have its own scale of charges and form of contract, and had come to the conclusion that while the present generally acknowledged scale was open to improvement, duplication in this case would lead to considerable misunderstanding and difficulty, and that with regard to a form of contract no better basis could be found than the form recently agreed upon by the R.I.B.A. and the Institute of Builders after negotiations extending over some years.

Finances.

During the past year further additions had been made to the reserve fund, which had now reached a total of £1,000. The auditors' report and balance-sheet would be presented at the November meeting.

The Membership

continued to increase steadily, but there was scope for further growth, and the Council suggested that during the coming session members should signalize the "coming of age" of the Society by introducing as many new members as possible. A little individual

effort in this direction should result in raising the total to say 1,000 members.

The Officers and Council

for the session 1904-5 were elected as follows:—*President*, Mr. Walter W. Thomas (Liverpool). *Vice-Presidents*, Mr. A. E. Pridmore and G. Gard-Pye (London). *Hon. Secretary*, Mr. Ellis Marsland. *Hon. Corresponding Secretary*, Mr. W. R. Mallett. *Hon. Treasurer*, Mr. B. R. Tucker. *Hon. Librarian*, Mr. R. G. Bare. *Council*: Messrs. G. E. Bond (Rochester), C. Cole (Exeter), J. W. Frazer (Newcastle), H. E. Knight (London), F. W. Macey (London), T. G. Price (Birmingham), F. W. Chancellor (Chelmsford), A. Curry (Jersey), J. C. Jackson, (London), E. M. Leest (Devonport), D. Morgan (Cardiff) and R. F. Vallance (Mansfield).

It was announced that the gold medal in the October examinations had been won by Mr. D. Griffiths, of Porthcawl, thus going for the second time to a Welshman. It was also announced that Miss Annie Hall (Cheltenham—a pupil of Mr. T. Overbury, of that town) had been registered as the first lady student of the Society.

Obituary.

Mr. Henry Gray, senior partner in the firm of Gray & Watkins, builders, &c., Ludlow, died recently.

The late **Mr. Haddon Hewitt** of the firm of Hewitt & Son, builders Tenbury, left estate which has been valued at £2,058.

Mr. T. V. Davison, C.E., died recently. He was the late borough surveyor for Windsor, having retired from that position in 1897 and taken the post of inspector of weights and measures, &c.

Views and Reviews.

New Edition of Purchase's "Masonry."

It is only a year since we noticed a fourth edition of this excellent book on masonry. Now a fifth is before us—ample testimony to the constant demand for it. The usefulness of the book has been extended by the addition of new sections on masonry estimating and quantity surveying, and on building stones, marbles and granites, including carefully compiled lists of stones actually on the market. Tables of diameters, circumferences and areas of circles are also appended. We can only repeat what we said a year ago—that this is one of the very best books on stone-working. It deals logically, practically and thoroughly with the whole subject.

"Practical Masonry," by William R. Purchase. Fifth edition. London: Crosby Lockwood & Son, 7, Stationers' Hall Court, price 7s. 6d. nett.

Carpentry.

The photographic illustrations are the chief feature of Mr. Jarvis's book on carpentry for beginners. These are excellent, because they show how the various operations of sawing, planing, paring, &c., are actually carried out, and thus the beginner can see at once how to use his tools; they are of special value in this respect because written descriptions would be of very little use. Of the rest, we may say that it is chiefly supplementary to the illustrations. All the ordinary operations are described; the beginner is told how to set a plane, use a chisel, sharpen a tool, make a joint; and many practical hints of all kinds are given. As an elementary book, then, it is to be heartily recommended.

Mr. Mitchell's book is of another class. It is intended for students following a course of training in woodwork as indicated by the

Board of Education or the City and Guilds of London Institute. It is more advanced than the other. The Board of Education's syllabus for manual instruction in woodwork is given at the front, and then follow chapters on timber, fastenings, tools, operations, joints and exercises, illustrated by a number of clear line drawings. The book is well got up and very easy to refer to, by reason of a good index and side-heads in italics.

"The Beginner's Guide to Carpentry," by Henry Jarvis. London: Percival Marshall & Co., 26-29, Poppin's Court, Fleet Street, price 1s. nett.

"Carpentry Workshop Practice," by Charles F. Mitchell and George A. Mitchell. New and enlarged edition. London: Cassell & Co., Ltd., price 1s. 6d.

Painting and Graining.

There seems to be quite an abundance of sixpenny handbooks just now. This one on painting and graining has the merits and defects of them all. Brief chapters are given on tools, materials and colours, paint-mixing, paintwork on wood and metal, graining and colouring in distemper. The subject has been written out in scores of books, but presumably there is a market for small manuals of this class. It is not comprehensive by any means, nor could it expect to be, but it is cheap enough for sixpence. We assume it is chiefly intended for students and apprentices.

"Painting and Graining," by S. Walter Newcomb. London: Dawbarn & Ward, Ltd., 6, Farringdon Avenue, E.C., price 6d. nett. (paper), 1s. cloth.

Luton Church in need of Repair.—The fine parish church of Luton, Beds, parts of which date from the twelfth and thirteenth centuries, is in urgent need of repair. The roofs of the nave and transepts, which most require attention, are of oak and are believed to date from Henry VIII's time. The architect, Mr. J. Arthur Reeve, estimates the total cost at £6,000.



THE LONDON COLISEUM: GRAND TIER CONSTRUCTION.

Keystones.

For Liverpool Cathedral the treasurers have now £230,000 in hand.

A Corridor of Shops is to be made out of some premises in Newport Road, Cardiff, from plans by Mr. E. Seward.

Competition for Wesleyan Hall, Westminster.—122 designs have been sent in for this building, which is to be erected on the site of the Aquarium.

At the Congregational Church, Worksop, new heating apparatus is being installed by Messrs. Stanley Sheen & Co., heating engineers, of Sheffield, on their small-pipe safe-pressure system.

The Crewkerne Hospital, erected to the memory of Queen Victoria, was opened last week by Sir Frederick Treves. It has cost £53,000. Mr. Edwin T. Hall, F.R.I.B.A., was the architect, and Mr. T. Munford, of Crewkerne, the builder.

The new Church of St. Mark, Byker Hill, Newcastle, is being erected at an estimated cost of £15,000 from designs by Messrs. Hicks & Charleswood, of Newcastle. Seating accommodation will be provided for 800. Messrs. J. & W. Lowry are the building contractors.

Old Heidelberg.—The Otto-Heinrichsbau at Heidelberg, the jewel of German Renaissance architecture in the famous ruined castle, is threatened with restoration at the hands of the Karlsruhe architect Schäfer. The proposal is meeting with determined opposition all over Germany.

A School of Arts and Crafts at Campden was opened last Thursday. Here, under the Board of Education and the Gloucestershire County Council, will be continued the work begun by Mr. C. R. Ashbee in the East End of London. An interesting seventeenth-century building has been renovated for the purposes of the school.

Further Improvements at Balmoral Castle are to be carried out under the direction of Sir Rowand Anderson, who had an audience of his Majesty three weeks ago, when the plans were discussed. His Majesty also intends to build a sanatorium for the benefit of the tenants and employees on the Royal estate, and a variety of other alterations and improvements are to be carried out.

Bradford Central Free Library to be Reorganized.—The removal of the art collections of the Bradford Corporation from the old gallery in Darley Street to the Cartwright Hall will enable the gallery to be added to the accommodation of the Central Free Library. Plans for this have been prepared by the city architect, Mr. F. E. P. Edwards, A.R.I.B.A., working in consultation with the city librarian, Mr. Butler Wood.

In Norwich Cathedral a stained-glass window has been erected in the north-eastern aisle to the memory of the late Mr. John Kitson, Registrar of Norwich, and his wife. It was designed and executed by Messrs. Clayton & Bell, of London, and corresponds to that erected in the south-eastern aisle to the memory of the late Archdeacon Nevill. The upper portion contains a full-length figure of St. Paul and the lower a representation of Gamaliel and Saul.

A Bristol Building.—Messrs. C. Weeks & Son, estate agents and furniture warehousemen, have erected a five-storey building in White Ladies' Road, Bristol. The style adopted is Classic Renaissance, and the central portion of the block, with its Ionic columns and boldly-projecting pediment, is flanked on each side by wings somewhat more plainly treated, the whole producing a dignified effect. Monk's Park Bath stone has been used throughout. Mr. H. Dare Bryan, F.R.I.B.A., was the architect, and Messrs. R. Wilkins & Son were the contractors.

A new Church at Newton Abbot is being erected. Mr. E. Sedding, of Plymouth and London, is the architect.

A new Chancel to St. John's Church, Wakefield, is being built from designs by Mr. J. T. Micklethwaite, of London, at an estimated cost of £3,600.

Birmingham Architectural Association.—Amongst the lecturers for the present session are Sir Oliver Lodge on lightning conductors, Prof. W. R. Lethaby, Mr. T. E. Colclutt on the new Savoy, and Mr. William Henman.

Messrs. Trollope & Sons and Colls & Sons, Ltd., have been awarded two grand prizes and three gold medals in connection with their exhibit of decorations, furniture and electric-light fittings in the suite of reception-rooms decorated by them in the British Royal Pavilion at the St. Louis Exhibition.

The new Church of St. Boniface, Chandler's Ford, Hampshire, has been completed. Mr. G. F. Bodley, R.A., was the architect and Messrs. Parnell & Sons, of Rugby, were the contractors. The church is warmed by a hot-air system installed by Messrs. Haden & Son, of Trowbridge.

New County Court Buildings at Middlesbrough have been erected from plans by Mr. H. N. Hawks, of H.M. Office of Works, at a cost of £12,000. Mr. J. Davison, of Stockton, was the contractor. The buildings are faced with Accrington bricks and "Queen's grit" stone from Pateley Bridge.

The Old Kent Road Public Baths are approaching completion. The total cost of the buildings will be £55,000. They comprise two swimming baths, first and second class (the former 76ft. by 35ft.), slipper baths, and Turkish and Russian baths. Water will be obtained from an artesian well at a depth of 400ft. Mr. E. H. Payne is the architect.

New Baths at Bramley, Bradford, have been built by the Corporation. Mr. J. Lane Fox, of Leeds, was the architect. There are twenty slipper-baths, a vapour bath, a Russian bath consisting of three rooms (hot, shower and cooling), swimming bath with a water area of 75ft. by 30ft., and laundry. The total cost of buildings and equipment will be about £10,600.

"To Associate Technical Instructors."—At a meeting of teachers in London polytechnics, technical institutes and schools of art held at the Birkbeck College on Saturday a resolution was passed deciding to form an association of such teachers, comprising those on permanent staffs and evening teachers, "other than those engaged in purely secondary work." An executive committee of fifteen members was appointed to draw up rules and constitution and to report to a general meeting to be held in January.—Referring to the editorial note on this subject in our issue for last week, Mr. John S. Goldthorp writes from Halifax saying that such an association exists in the West Riding and has done good work for several years.

The Architecture of Berlin was the subject of a lecture delivered by Professor Gourlay before last week's meeting of the Glasgow Technical College Architectural Craftsmen's Society. The subject was divided under three heads:—(1) New buildings in Berlin, including the cathedral, the Emperor William Memorial Church, the Imperial Houses of Parliament, the Upper and Lower Houses for the Prussian Parliament, the national monument to Emperor William I., the Emperor Frederick Museum, opened on the 18th of this month; (2) the Royal Technical High School at Charlottenburg, with notes on the system of education there; and (3) Berlin as a city, its past, present and future from an architectural point of view. The lecture was fully illustrated, and many points and details were elaborated by black-board sketches.

DEATH OF PROFESSOR KERR.

MR. ROBERT KERR, F.R.I.B.A., a Fellow and Emeritus Professor of King's College, London, and for forty-two years district surveyor of St. James's, Westminster, died on Friday at his residence, 31, Cathcart Road, South Kensington, in his eighty-second year. He was a native of Aberdeen, and was educated there. He became a pupil of John Smith, the city architect. When the Architectural Association was formed in 1847 Mr. Kerr was elected its first president; and ten years later was elected a Fellow of the Royal Institute of British Architects. In 1861 he was appointed Professor of the Arts of Construction at King's College, London, and continued in the occupancy of that position till his retirement in 1890. He did a considerable amount of professional work, some of the best examples of his constructive ability being Bear Wood, in Berkshire, the home of the Walter family, which he designed for the late Mr. John Walter, and the National Provident Institution in Gracechurch Street. He had also published several professional works, including "The English Gentleman's House," "The Consulting Architect: Practical Notes on Administrative Difficulties," and the third edition of "Fergusson's History of Modern Architecture."

"URALITE" COMPETITION.

IN April last the British Uralite Co. offered prizes to architects and ship draughtsmen for the best original designs or practical suggestions for fixing "Uralite." It was intended at first to make the awards in July, but owing to the large number of drawings sent in the decision of the judges was delayed. We are now able to publish the awards, which are as follows:—

Architectural Competition: First prize (value twenty guineas), Mr. Alfred E. Sidford, M.S.A., Wokingham, and Mr. Murray Spry (jointly). Other prizes in order of merit as follows:—Messrs. John Huxtable, architect, Herne Bay; E. C. Ackermann, Holloway, London, N.; Percy N. Brown, Holmfirth, Yorks; Pooley & Follett, architects, Adelphi, London; C. F. A. Voysey, architect, Baker Street, London; C. L. Cox, architect, Ilford.

Shipbuilding Competition: First prize (twenty guineas), Mr. G. A. Lax, naval architect, Newcastle-on-Tyne. Other prizes in order of merit as follows:—Messrs. F. W. Haddy, Barrow-in-Furness; D. M. Wallace, Greenock; W. R. Ould, Glasgow; Archibald Scott, junr., Glasgow; William Dawson, Govan—all naval architects.

The following gentlemen also sent in drawings which were highly commended by the judges:—Architectural: Messrs. A. Hickingbotham (East Dulwich), B. Flatman, (Croydon), W. G. B. White (London), W. V. McNae (London), A. Stapley (London), H. G. Warren (Exeter), G. Lambden (Maidstone), James A. Smyth (Cambridge), A. G. Bell (Nottingham), W. H. Clarke (Matlock Bath), W. H. Ratcliffe (Darlington), Charles Stone (Pinner), George Robson (Sheffield), A. Waldron (London), J. S. Goldthorp (Halifax), J. Webb (Burton-on-Trent), G. H. Short (Alnwick), E. W. Leeson (Manchester), F. J. Felts (Cambridge), L. W. Tracey (Birmingham).

In the shipbuilding competition, the following sent in drawings which were highly commended:—Messrs. E. D. Figari (London), T. R. Creffield (London), H. B. Tiltman (Ilford), T. J. Saunders (Pembroke Dock), J. A. McArthur (Port Glasgow), W. T. Clark (New Brompton).

Large numbers of drawings were received which had to be returned to the competitors owing to the fact that sections were introduced which the Company are at present unable to manufacture.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Building Trades' Exhibition.

G. writes: "When and where is the next building trades' exhibition to be held in London?"

From April 29th to May 6th next year at the Royal Agricultural Hall, Islington.

Liability for Damage to Roof caused by Storm.

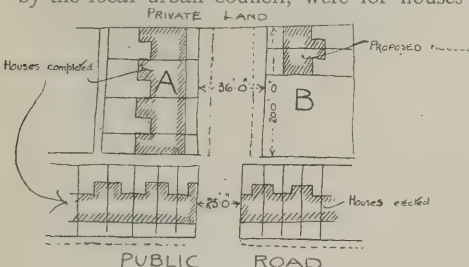
HULL.—ROOF writes: "On the roof of a building in course of erection there is a lead flat. During a storm a large part of the lead was blown off, falling on the slates and breaking some. Who is responsible for the work which will have to be done over again? The contractors, in their agreement, say 'all work to be left perfect at completion.'"

Unless there is a clause in the contract exonerating them from loss in such a case, the contractors alone are responsible for making good storm damage during the progress of a building. They have agreed to deliver a completed building and must, of course, fulfil their contract. It is, however, quite possible that they are entitled to a reasonably longer period in which to complete the work.

F. S. I.

Building in New Street with Narrow Entrance.

NEWQUAY.—E. writes: "About four years ago a builder leased for building purposes the land marked A and B on the accompanying sketch. His plans, submitted and approved by the local urban council, were for houses



on plot A, but the block plan also showed the houses on the B plot marked 'proposed houses.' The B plot has now been sublet to another builder, who is desirous of erecting a pair of houses, but he is told that he cannot do so because the entrance is not of sufficient width, namely, 36ft. Have the council any power to prevent the proposed buildings being erected, by reason of the narrow entrance? If so, what can the owner of the land do?"

As the proposed buildings are within the area of an urban district council, there is no doubt (though you say nothing on the point) that the usual by-laws have been adopted and that all building must be in accordance with them. The usual by-law in respect to the width of streets runs: "Every person shall . . . so . . . lay out a new street . . . that the width thereof shall be 36ft. at the least. Every person . . . shall at one end at least of such street . . . provide . . . an entrance of a width equal to the width of such street and open from the ground upwards." I am of opinion, therefore, that the urban district council have no option but to refuse to pass your plans. You should procure a copy of the local by-laws and verify the above extracts.

F. S. I.

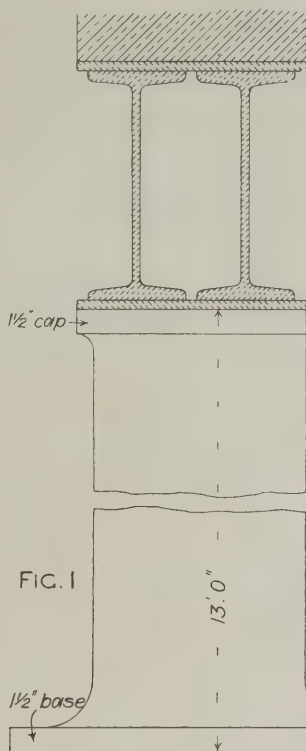


FIG. 1

FIG. 2

TRIANGULAR COLUMN FOR SHOP FRONT.

Designing Triangular Column for Shop Front.

LOWESTOFT.—Q. E. D. writes: "What thickness of cast-iron must a stanchion of the shape shown on sketch be, to carry a weight of 45 tons safe load? Also, thickness and area of cap and base. Would brackets be needed to stiffen the cap and base at the narrow end of the section? I should be glad if you would give a simple formula showing how I can work out a column of this section."

There is no simple formula applicable to this case. A part elevation is shown by Fig. 1 and section by Fig. 2, the thickness of metal being assumed at 1 1/2 ins. The centre of gravity of the section must be found first. This is done by cutting out the section in drawing paper and suspending it from two different points; the centre of gravity will be where the vertical lines cross. The area of the section will be found by planimeter to equal 45 sq. ins. The centre line of load is 6 ins. from the point, and the neutral axis passing through the centre of gravity of the section will be 8 1/2 ins. from the point. Another drawing of the section must now be made to a larger scale and the inertia areas constructed as in Fig. 3.

They must be cut out and suspended to find the centre of gravity of each, and the moment of inertia will then be the distance from the neutral axis to the centre of gravity of inertia area + the same for the other side of the neutral axis = $(8 \cdot 125 \times 9 \cdot 36 \times 4 \cdot 625) + (4 \cdot 875 \times 14 \cdot 94 \times 3 \cdot 65) = 617 \cdot 56987$, say 617.57 in. inch units. Then, by "Part II., Designing Ironwork, 2nd Series," p. 34 (Spon,

2s. 6d.), the maximum stress $s = \frac{W}{A} \left(1 + d \frac{DA}{I} \right)$

where w = total non-axial load in tons, d = distance of centre of pressure of non-axial load from neutral axis of section, A = area of cross-section in square inches, D = distance of point of maximum stress from neutral axis in inches, I = moment of inertia of section in inch units, s = maximum stress in tons per square inch. In the present case, cast-iron being capable of bearing a maximum working load in compression of 7 tons per sq. in., we have $s = 7$, and therefore, with the

data above, $7 = \frac{W}{45} \left(1 + 2 \cdot 125 \times \frac{8 \cdot 125 \times 45}{617 \cdot 57} \right)$

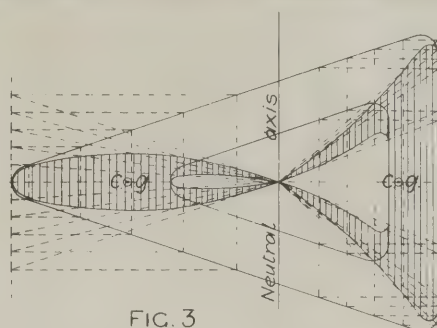
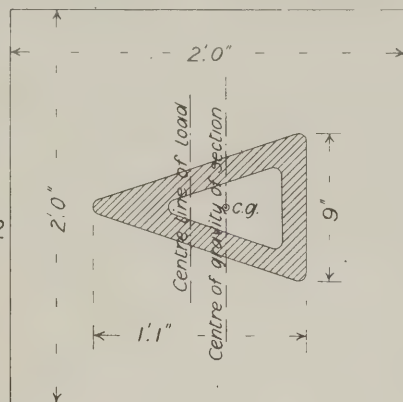


FIG. 3



$$\text{or } 7 = \frac{W}{45} (1 + 2 \cdot 125), \text{ whence } W = \frac{7 \times 45}{2 \cdot 25} =$$

140 tons, which would be the safe load upon a cube of cast-iron of the same sectional area as the column. Now assume the least diameter of the column to be the width across the centre line of loading = 4.6 ins., and the ratio of height to diameter will be $\frac{13 \times 12}{4 \cdot 6} = 34$. Then by Gordon's formula

$$p = \frac{f}{1 + \frac{a}{c} \left(\frac{l}{d} \right)^2} = \frac{7}{1 + \frac{1}{1000} (34)^2} = \frac{7}{2 \cdot 16} = 3 \cdot 24$$

tons per square inch safe load. Then if 3.24 tons is the safe limit for the given column when a cube will bear 7 tons, the load of 140 tons which produced 7 tons stress must be reduced to $140 \times \frac{3 \cdot 24}{7} = 64 \cdot 8$ tons to limit

the actual stress to 3.24 tons per square inch. The load to be carried is only 45 tons; therefore, if it be desired to reduce the thickness to the lowest possible limit for safety, we have $1 \cdot 5 \times \frac{45}{64 \cdot 8} = 1 \cdot 04$, say 1 1/8 ins. as the

required thickness of metal. The bottom flange should be not less than 2ft. square, stiffened by brackets with hollow fillets in the angles, and 1 1/8 ins. thick, resting on hard York stone not less than 3ft. square and 9 ins. thick. The top flange may be 14 ins. by 11 ins. if desired, but the projecting angles should be stiffened by brackets. HENRY ADAMS.

What is a Central Courtyard.

LONDON.—DOUBTFUL writes: "Must a central courtyard have an entrance on one side, or can a central court enclosed by buildings on all four sides be considered a 'courtyard'? I ask this question in connection with the Soane competition this year, the design required for which is a royal palace, to be about 250ft. from north to south and about 680ft. east to west, with a central courtyard. On the west side is a garden 20ft. below the level of site. Personally, I do not think an enclosed court would comply with the conditions, as the present-day meaning of 'courtyard' is a place where you enter before reaching the main entrance."

"Court" and "courtyard" are the same. The derivation is from the Latin *cors*,

cortis, contracted from *cohors*, *cohortis*, a yard. Dictionary definitions give "an area or space enclosed before or behind a house; a place shut in by the wings or parts of a building or by different houses; an enclosed area; a yard; a yard enclosed by buildings": out of all of which we may take it that a courtyard can strictly be called such both when it has an entrance or entrances from one side, or from more than one side, and when it is completely enclosed. A central courtyard into which the rooms light is a common feature in architecture and probably a relic of the days when the outside of a house was made as safe as possible from attack. Our own opinion is that the Soane design is intended to have an independent main entrance and a central courtyard entirely enclosed by the palace rooms, maybe with entrances into it through an arcade on the ground floor, or otherwise.

S.K. Examinations, 1904.

BOURNEMOUTH.—F. F. writes: "Have you published the answers to questions set in the Board of Education (South Kensington) building construction examinations, 1904?"

Yes. Stage I. in the issue for May 18th, and Stages II. and III. and Honours in the issue for June 8th.

Models of Buildings.

WINCHESTER.—D. G. writes: "Please explain briefly the best way to construct models of buildings to scale from plan. Are there any books dealing with them?"

They are most easily made with cardboard or, better, Bristol board, the plan and elevations being drawn on it and coloured, then cut out and glued up, chimneys and ventilators being made out of wood, with felt or baize for grass and fine gravel sprinkled over gum for the paths. See a reply on p. 168 of our issue for October 16th, 1901. The only book on the subject is Richardson's "Architectural Modelling in Paper," to be obtained from our offices, price 1s. 6d. post free.

"Architecture."

HEREFORD.—H. S. writes: "About the year 1896 you published a monthly journal called 'Architecture,' which I think was continued until the year 1898. What was the date and number of the last issue? Can back numbers be obtained at your offices?"

"Architecture" was never really published by us, but by a former manager as his own venture. Not long after it appeared THE ARCHITECTURAL REVIEW was produced by us, and in due course "Architecture" died. There were twenty-eight numbers of it, and Mr. Batsford, of 94, High Holborn, W.C., bought up the stock that was left. You should apply to him therefore for any copies you are wanting.

Building up a Quantity Surveyor's Practice.

D. writes: "I am endeavouring to build up a practice as a quantity surveyor, and, like all other beginners, find it rather a difficult process. Should I be transgressing the rules of professional etiquette if I called personally on architects in my neighbourhood in order to get a connection together?"

We think you would be quite within the rules of professional etiquette in doing so, provided you introduced yourself in a proper manner. You must avoid giving the impression that you have called with samples of tea or that you represent a key-insurance agency.

Motor-Car Sheds.

NEWPORT, I. W.—X. writes: "What should be the inside dimensions of a shed for a medium-size motor car? What should be the position and size of pit in same? Are any special fittings necessary? Do you know of any book on the subject?"

"Some Notes on Motor Houses," with

illustrations of the paving, channelling and pit, were given in our issue for August 10th last, and in "Specification, No. 7" particulars will be found of "Stables for Motor Cars" by Mr. E. Keynes Purchase, F.S.I., honorary architect to the Automobile Club. For a small car the shed should be about 10ft. by 14ft., and the pit about 2ft. gins. wide, 4ft. deep and about 6ft. long. There should be a clearance of at least 2ft. on each side of the car when in the shed, and room must be allowed for a small engineer's bench. The doorway should not be less than 8ft. 6ins. high. There are no special fittings, except perhaps some overhead pulley tackle for lifting out parts of the motor. Lockers and cupboards will of course be needed. We do not know of any book on the subject.

Harmonizing Mahogany and Oak.

X. writes: "Some old dark mahogany work is desired to be harmonized with new oak panelling. Can this be done by staining of any description, or will it be necessary to paint and grain?"

To paint and grain oak is most reprehensible. We do not believe in touching the wood in any such way. That new oak work should have been associated with old mahogany with the idea of harmonizing the two is frankly absurd, but if something must be done we suggest that the best thing will be to fumigate the oak, as described in our issue for December 19th, 1900.

The Borough Engineer.

DALKEITH.—BUILDER writes: "Is it necessary that a borough engineer and sanitary inspector (combined offices) should reside within the borough in which he is employed?"

The borough engineer or surveyor need not necessarily reside in the borough, though it is advisable he do so, and most authorities stipulate for this in the agreement.

Work to Measure for the R.I.B.A. Final Examination.

HAMMERSMITH.—I. T. P. writes: "Would measured drawings of Chiswick Parish Church be accepted by the council of the R.I.B.A. as testimonies for the final examination? The tower is the only original part of the church that remains, but I think the modern portion was designed by C. W. Pearson. If this building is unsuitable, please name another example in or near West London."

I should not recommend you to measure any modern work for the R.I.B.A. final examination when you have such buildings as Hampton Court, Kensington Palace and Holland House, where you can get permission to measure. If you prefer Gothic, why not measure part of St. Saviour's, Southwark, or else go into the country for a weekend to one of the beautiful Kentish churches?

G. A. T. M.

Architects' Assistants under Government.

MANCHESTER.—R. M. writes: "What British Government positions, at home and abroad, are open to architects' assistants? Where can I obtain particulars of them?"

If you write to the secretary of the Civil Service Commissioners, Burlington House, W., he will send particulars of all Government positions for which architects' assistants are eligible, and for which there is open competitive examination. Almost all the departments, however, employ a large number of temporary assistants, and in some instances, notably in the Office of Works, the permanent staff is recruited entirely from the temporary staff by a limited competition amongst nominated candidates. Application for employment as a temporary assistant should be made by letter addressed to the chief of each department, as for instance, to the Chief Surveyor, Office of Works, Storey's Gate, S.W.; the Director of Works, Admiralty, Northum-

berland Avenue; and the Chief Surveyor, Royal Engineers, Horse Guards. Colonial positions are scarcely to be obtained save by residents in the Colonies. G. A. T. M.

Formula for Cast-iron Columns, &c.

HULL.—A. G. writes: "Which is the best formula for calculating the strength of a cast-iron column? Also, please recommend a cheap book on descriptive geometry, the projection of solids, suitable for the R.I.B.A. examination."

There are many different formulæ for finding the strength of cast-iron columns, and a comparison of eleven different methods applied to the same case will be found in "The Practical Designing of Structural Ironwork" (Spon, 8s. 6d.), pp. 121-140. Hodgkinson's is perhaps the most reliable, but is cumbersome to use. Gordon's formula is handier and applicable to other purposes: for cast-iron columns, fixed at both ends by having flat capitals and bases, it is $P = \frac{36 S}{1 + \frac{l^2}{800 d^2}}$, where P = crushing load in tons,

S = sectional area in square inches, d = least external diameter and l = length, both in same units. A factor of safety of 10 is usual with this formula for dead loads. The common formula for rolled joists $w = \frac{cad}{l}$ is a good one when used with the proper constants. w = breaking weight in tons in centre, a = nett area in square inches of one flange + $\frac{1}{6}$ of web (remainder of web assumed

to resist shearing only), d = total depth in inches (or for greater accuracy d = mean depth from centre to centre of flanges), l = length of span in feet, c = constant 7 for rolled iron joists, 6 for compound girders of iron joists with equal flanges, 10 for rolled steel joists and 9 for compound girders of steel joists with equal flanges. There are many other formulæ given in "Designing Ironwork," 2nd Series, Part IV. (Spon, 2s.), with examples of their use. The majority have the disadvantage that a rolled joist must be assumed and then the strength found. The books recommended by the R.I.B.A. for geometry and projection are Tarn's "Practical Geometry" (7s.), Heather's "Practical Plane Geometry" (2s.), Heather's "Descriptive Geometry" (2s.), Davidson's "Elements of Practical Perspective" (3s.), Dobson's "Rudiments of Masonry and Stone-cutting" (2s. 6d.), and to these might be added Middleton's "Linear Perspective" (1s.). See THE BUILDERS' JOURNAL book list.

HENRY ADAMS.

Measuring Paintwork.

WORKINGTON.—H. H. writes: "(1) Which is the best way to measure woodwork for painting? Mr. W. E. Davis takes the same measurements as for joiner and adds one-eighth (or more) for edges and projections, &c. In Mr. Banister Fletcher's work, however, the student is advised to make proper additions to height and width for such items. (2) How should casement and double-hung sashes be taken? Mr. Davis merely numbers them, taking each window as two for both sides, while in 'Fletcher' the superficial area is taken, afterwards numbering the frames, taking one side only. (3) How should painting to rebated door-frames be taken? (4) Should the painting to architraves be measured separately and added to the woodwork? Mr. Davis does this, but Mr. Fletcher appears to include them in superficial area of sashes and frames."

(1) This is entirely a question of expediency. While no trouble should be spared to obtain measurements as correctly as possible, in painter's work it is somewhat difficult to arrive at exact measurements. Though in items such as window boards, linings and architraves it is possible to add the edges to

the dimensions, it is certainly not practicable to do so in panelled work and, say, match-boarding and items of this nature, as any addition must of necessity be of a somewhat "sporting" character. In practice it has been found that (except in a few cases where the discretion of the surveyor must be exercised) an eighth added to the dimensions covers the edges and the extra for panel moulds, beads, &c. (2) Casement and sash frames should be numbered for each side and the squares numbered separately, again taking each side. The painting inside and outside is frequently of a different description: hence the necessity of taking each side separately. (3) If frames, merely the length by rft. will generally cover these (nothing under rft. girth should be taken as superficial). If with linings and architraves, the whole girth should be taken. Should the painting vary on each side, then a "run" of "painting door-frame one side" should be taken for each side, unless there are linings and architraves on one side, in which case the girth should be taken for that side commencing with the junction of inside and outside painting. (4) This, being a continuation of the painting of the frames, should be measured the nett girth. This would also apply to window boards.

W. E. D.

Work Approved and Condemned by Surveyors.

X. writes: "Is the local authority responsible for work approved by its surveyor and condemned by his successor?"

This is a legal question, and much would depend in any particular case upon the exact circumstances, as to the bearing of which legal advice should be sought. Generally it may be stated that where a local authority have legal power to delegate authority to a surveyor, and do so, they will be bound by his acts. This is usually the case under contracts for the supply of materials or execution of works, especially where the surveyor is made sole arbitrator. In some cases the authority will be equally bound by the acts of their officer even if he has exceeded the powers delegated to him, the authority's remedy being against the officer. Fraud or collusion

might, however, affect any of these cases. As to statutes and by-laws with regard to which the local authority themselves have no discretionary power, a departure authorised by a surveyor would be invalid. The Public Authorities Prevention Act, 1893, might also affect any case.

Lightning Conductor passing over Window Frame.

LONDON.—A. H. writes: "Is it in any way undesirable that a copper tape lightning conductor be fixed to the wood frame of a window? A chimney stack on the face of which a lightning conductor runs has been used for a telephone attachment, the same being fixed up by wire straps which encircle the chimney and thus are in immediate contact with the copper conductor. Is there any possibility of harm in this?"

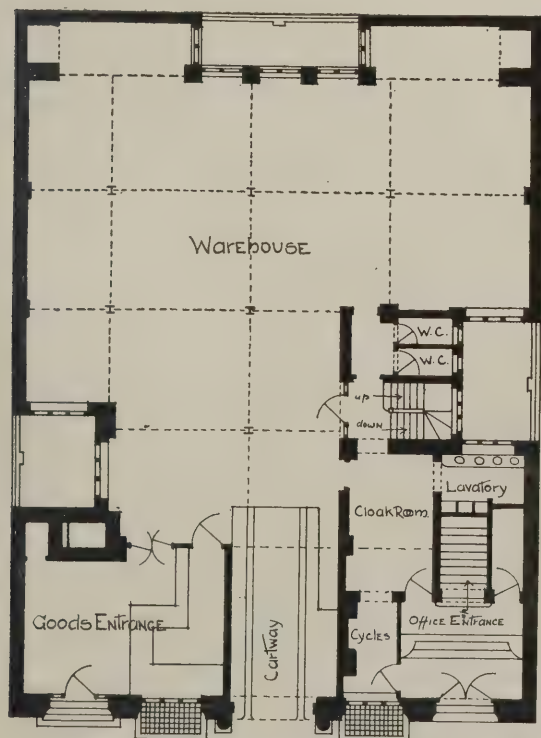
There is no objection to the fixing on the wood frame *per se*, provided this does not bring the conductor dangerously near other metals; for instance, there might be a gas pipe inside the room by the side of the window, and, if so, a dangerous alternative path to earth would be provided by the metal pipe. A safe distance through in a straight line would be (for wood, brick or stone) about 5ft., provided the conductor had a really good earth connection, a greater distance being necessary in proportion to the resistance of the conductor "earth" if that is not quite perfect. The proximity of the conductor to the telephone attachment suggests the possibility of very dangerous combinations. If the leading-in wire passes near a gas pipe, either on the surface or concealed in plaster, a similarly dangerous alternative path to earth would be open, as the "lightning arrester" on the telephone case is probably wired with a view to the protection of the instrument and not the building. No effective insulation of the conductor from the telephone wire is possible, and, in default of full details, the only remedy appears to be to examine the course of the wire through the building and have it altered if it passes near gas- or water-supply pipes, or other metallic complications.

ALFRED HANDS.

OUR PLATES.

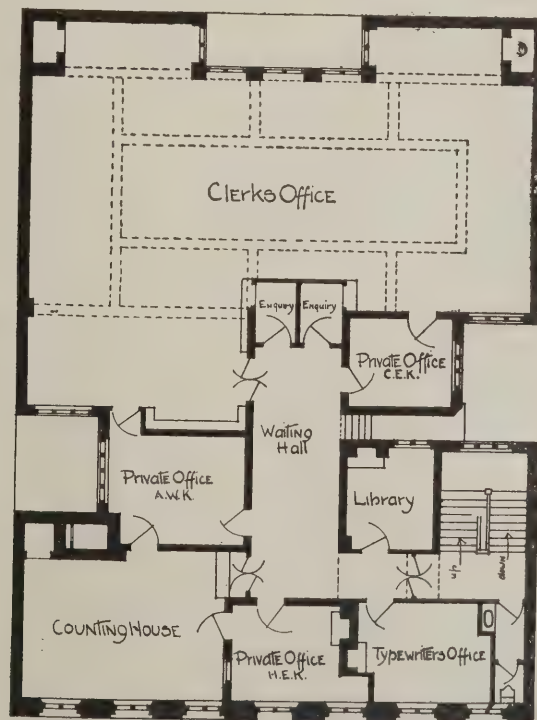
M. R. RAINE'S sketches do not call for comment. Their interest is in themselves and the architecture they portray.—The warehouse in Great Charles Street, Birmingham, has been erected for Messrs. Keep Brothers, Australian and Cape merchants, and has a main frontage of 60ft. Large stock rooms occupy the basement and most of the ground floor. The goods entrance in the middle of the front is arranged so that goods may be unloaded entirely within the building. The offices are on the first floor, and each directly communicates with the central waiting hall. Between the latter and the large clerks' office are enquiry boxes, sound-proof from one another. The private offices of the three members of the firm communicate with and overlook their special departments. A second floor on the front of the building provides additional rooms for clerks and typists, and the caretaker is accommodated in the attic. The front is of Coxbench stone and Woodville sandstock brick, and the roof is covered with Precelly green slates. The architect was Mr. W. H. Bidlake and the contractor Mr. T. Rowbotham, of Birmingham. The drawing which we reproduce was exhibited at the Royal Academy this year.—The street front at Colchester by Mr. W. Campbell Jones, F.R.I.B.A., is the front elevation of new premises in the High Street which have recently been erected for the London and County Banking Co., Ltd., on the site of the old bank. Above the first-floor windows the building is faced with brown Portland stone with bands of blue pennant; below this, grey Cornish granite is used. The joiners' work and the office fittings are carried out in teak. There is ample strong-room accommodation in the basement, and above the ground floor is a residence for the manager, with tradesmen's entrance from Culver Street at the rear. Considerable difficulty was met with in planning, owing to the narrowness of the site, and this necessitated placing the entrance to the manager's residence on the mezzanine landing, approached from the bank lobby.

Scale 1" = 10' Feet



Ground-Floor Plan.

WAREHOUSE, GREAT CHARLES STREET. BIRMINGHAM. W. H. BIDLAKE, ARCHITECT.



First-Floor Plan.

Trade and Craft.

Doors in Hospitals.

An interesting statement on the subject of doors for hospital wards was made by Mr. Saxon Snell, F.R.I.B.A., at the recent Sanitary Institute Congress at Bradford. The doors should be wide enough to allow of the passage of a bed. It was desirable that the upper panels should be glazed with clear glass. Regarding the material for joinery, he said hardwood throughout, oiled or French polished, was generally adopted where the question of cost was not vital. Its comparative freedom from shrinkage, and its harder or less absorbent surface, were great advantages. Nevertheless, he thought that soft

wood covered with enamel paint was not much, if at all, inferior. He hoped in time to obtain what may be called solid joinery, i.e., built up without panels, with their inevitable sharp internal angles which could only be kept clean at the cost of great labour. Of course, it was possible to have solid or flush panels, but shrinkage soon showed up the joints, which then became dust traps impossible to clean. There were some Canadian doors now made of which the principle of construction could, no doubt, be applied so as to successfully overcome this difficulty. They were made up of quite small sections of wood very closely fitted together, and sheathed with hardwood beautifully dovetailed to the whole, pressed and almost

welded together by hydraulic pressure. At present they were made to imitate the ordinary panelled door; but one was being made for him (as an experiment) of solid soft wood, sheathed all round in oak. [The doors referred to are made by the Gilmour Door Co., Ltd., of Trenton, Canada, and 52, Berners Street, London, W.]

New Companies.

GRACE AND ROBSON, LTD., granite and stone quarry proprietors, &c. Capital: £25,000.

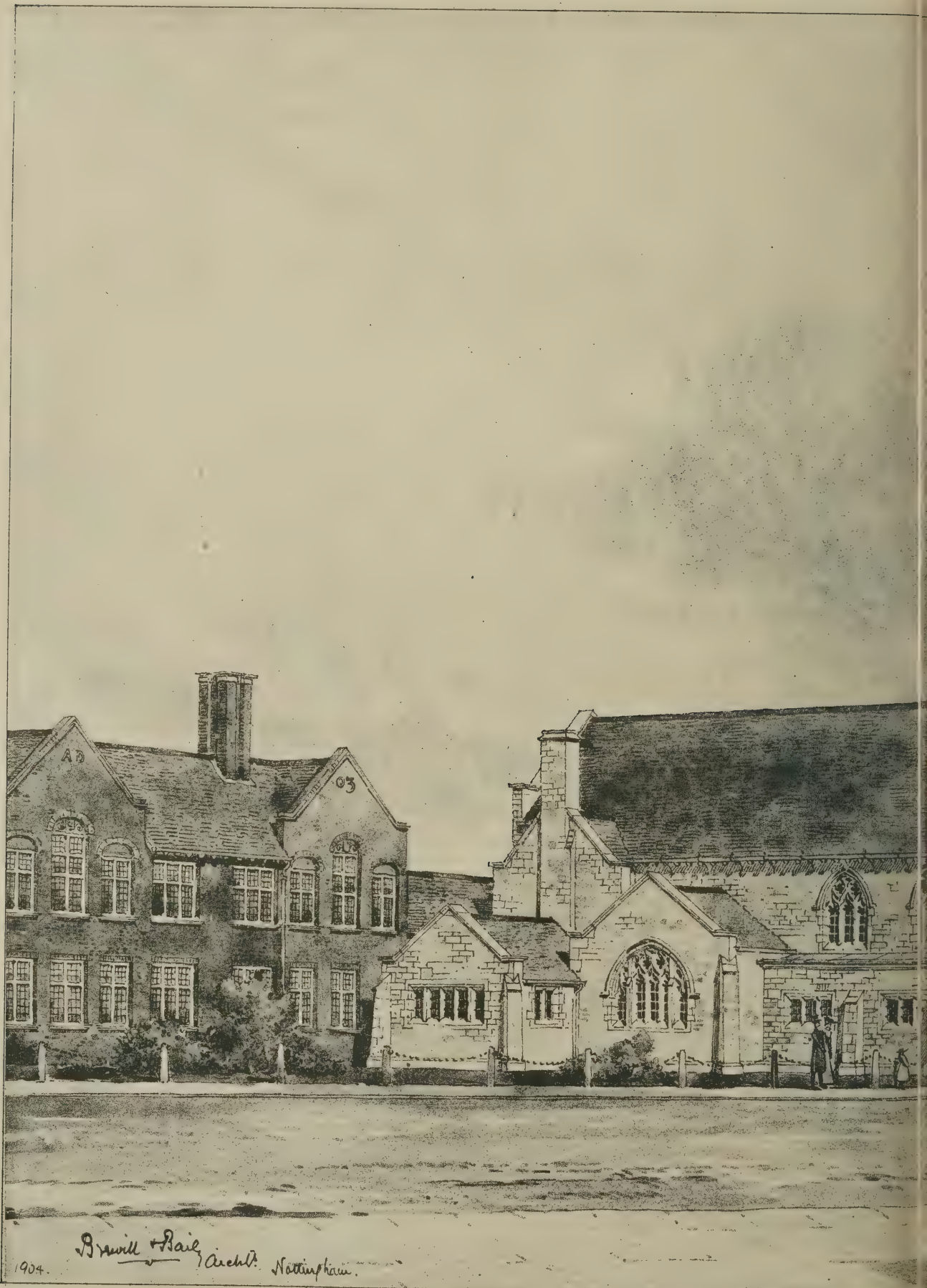
ERITH BRICK, TILE AND TERRA-COTTA CO., LTD., 11 and 12, Cambridge Chambers, Lord Street, Liverpool. Capital: £15,000.

EAST ARVON SLATE QUARRIES, LTD. Capital: £10,000.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Oct. 27	Dundee—Paving Shed	Harbour Trustees...	J. Thompson, Harbour Engineer, Dundee.
" 27	Wainsgate, near Hebdon Bridge—Walling, &c.	Guardians	T. Kershaw, Architect, Leeds and York Bank Chambers, Halifax.
" 27	Dudley—Pulling Down and Rebuilding Wards	Commissioners	Arthur Marshall, Architect, King Street, Nottingham.
" 27	Aldershot—Post-Office	Commissioners	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 27	Farnborough—Post-Office	Urban District Council	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 28	Ashford, Kent—Mortuary	Rhondda U.D.C.	W. Terrill, Surveyor, North Street, Ashford.
" 28	Penynglyn, Wales—School	Urban District Council	Jacob Rees, Hillside Cottage, Pentre.
" 28	Rhondda—School	Guardians	J. Rees, Hillside Cottage, Pentre.
" 28	Hull—Alteration to Office	Parks Committee	T. Beecroft Atkinson, 11 Trinity House Lane, Hull.
" 28	Manchester—Tea Room	Corporation	City Architect, Town Hall, Hull.
" 28	Hull—Underground Convenience	Urban District Council	A. G. White, Town Hall, Hull.
" 28	Broadstairs—Extension of Boiler-house, &c.	Metropolitan Asylums Board	Council Offices, Broadstairs.
" 29	Hampstead, N.W.—Alteration, &c., to House	A.B.C. Syndicate	Office of Board, Embankment, E.C.
" 29	Hampton Wick—Demolishing a House	Managers of Maintained Schools	W. H. Hope, Architect, Seymour Road, Hampton Wick.
" 29	Weston-super-Mare—Six Houses	Urban District Council	E. T. Gilmore, Architect and Surveyor, Weston-super-Mare.
" 31	Great Berkhamstead—School	Industrial Co-operative Society	C. H. & N. A. Rew, 185 High Street, Great Berkhamstead.
" 31	Wallasey—Public Offices	Borough Council	H. W. Cook, Public Offices, Egremont, Cheshire.
" 31	Leeds—Store and Two Houses	Urban District Council	Society's Building Depot, 24 Meadow Road, Leeds.
" 31	Paddington—Waterway Wall	Urban District Council	Borough Surveyor, Town Hall, Paddington, W.
Nov. 1	Troedryhiw, Wales—Renovation of Church	Commissioners	William Tyley, 16 Tyddal Terrace, Troedryhiw.
" 1	East Croydon—Enlargement of Sorting Office	Committee of Northern District of Ayrshire Combination	H.M. Office of Works, &c., Storey's Gate, S.W.
" 1	Kilwinning, N.B.—Hospital	Sunderland and South Shields Water Company	J. & J. Armour, Architects, Irvine.
" 1	Sunderland—Engine-House	Cheshire County Council Education Committee	The Offices of Company, Maritime Buildings, St. Thomas Street, Sunderland.
" 2	Altrincham—School... ..	Urban District Council	Joseph Howarth, Education Offices, Market Street, Altrincham.
" 2	Litherland, Lancs—Decoration, Repairs, &c.	Right Hon. Earl of Leitrim	A. H. Carter, 25 Sefton Road, Litherland.
" 2	Carrigart, co. Donegal—Alteration, &c., to Hotel	Guardians	W. H. Stephens & Sons, Surveyors, Donegal Square N., Belfast.
" 3	Richmond, Surrey—Board-Room	Town Council	Percy Umney, Clerk, Union Chambers, Richmond, Surrey.
" 3	Bateley, Yorks—Walls	Newbottle and District Co-operative Society, Ltd.	Borough Surveyor, Branch Road, Bateley.
" 5	Shiney Row, Durham—Shops, &c.	Urban District Council	A. Martyn, Secretary, Society's Office, Newbottle.
" 5	Stockton-on-Tees—Extension to Chancel	Urban District Council	Charles S. Frington, A.R.I.B.A., Victoria Buildings, Grainger Street, W., Newcastle-on-Tyne.
" 5	Swanage—Wall	Urban District Council	Surveyor to Council, Town Hall, Swanage.
" 11	Southall, Middlesex—Lodge	Urban District Council	Reginald Brown, Surveyor, Public Offices, Southall.
" 28	St. Anne's Head, Pembroke—Coastguard Buildings	Governors	Civil Engineer, H.M. Dockyard, Pembroke Dock.
" 28	Newcastle-on-Tyne—Schools	Guardians	H. J. Criddle, Northern Assurance Buildings, 2 Collingwood Street, Newcastle.
Dec. 20	Lambeth—Conversion of School into Home	Guardians	W. Thurnall, Clerk, Guardians' Offices, Brook Street, Kennington Road, S.E.
ENGINEERING:			
Oct. 31	Leiston, Suffolk—Mainlaying	Urban District Council	James Baldry, Surveyor, Snape Road, Leiston.
" 31	Rio de Janeiro—Machinery, &c.	Brazilian Central Railway Co.	Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
Nov. 5	Buxton—Valves, &c.	Urban District Council	G. H. Hill & Sons, Engineers, Albert Chambers, Albert Square, Manchester.
" 7	Frinton-on-Sea, Essex—Sea-wall	Urban District Council	A. M. Bate, Surveyor, Council Offices, Frinton-on-Sea.
" 12	Swansea—Crane, &c.	Harbour Trustees	C. A. L. Prusmann, Borough Electrical Engineer, Strand, Swansea.
" 27	Dundee—Covering for Pipes	Corporation	J. Thompson, Harbour Engineer, Dundee.
" 28	Sunderland—Generators	Guardians	John F. C. Snell, M.I.C.E., Town Hall, Sunderland.
" 28	Barrow-in-Furness—Combined Carving Table and Hot Close	Urban District Council	Master, Workhouse, Barrow-in-Furness.
" 28	Walthamstow—Heating	Urban District Council	G. W. Holmes, A.M.I.C.E., Town Hall, Walthamstow.
" 28	Broadstairs—Boiler	Urban District Council	Percy Griffith, 54 Parliament Street, London, S.W.
" 29	Devonport—Condenser	Gas Committee	R. J. Fittall, Town Clerk, Devonport.
" 29	London, N.—Laundry Machinery	Hornsey Town Council	E. J. Lovegrove, Borough Engineer, Municipal Offices, 99 Southwood Lane, Highgate, N.
IRON AND STEEL:			
Oct. 27	Chatham—Fencing	Corporation	Charles Day, Borough Surveyor, Town Hall, Chatham.
" 27	Dundee—Rails	Harbour Trustees	John Thompson, Harbour Engineer, Dundee.
" 27	Hull—Girders, &c.	Corporation	A. E. White, City Engineer, Town Hall, Hull.
Nov. 1	Gravelly Hill, near Birmingham—Iron Fencing, &c.	Guardians of Aston Union	William Whitwell, Architect, 23 Temple Row, Birmingham.
" 2	Watford—Pipes	Urban District Council	Engineer, Council Offices, 14 High Street, Watford.
PAINTING AND PLUMBING:			
Oct. 27	London, N.—Painting outside of School	Guardians	Master, St. Mary's School, Islington, N.
Dec. 5	Camberwell—White Lead, Oils, &c.	Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
ROADS AND CARTAGE:			
Oct. 27	London, N.—Road-making, &c.	Hackney Borough Council	Norman Scorgie, Borough Engineer and Surveyor, Town Hall, Hackney, N.
" 27	Willington, Tynemouth—Road Works... ..	Tynemouth R.D.C.	A. S. Dinning, 21 Ellison Place, Newcastle-on-Tyne.
" 28	Pentre, Rhondda—Street Works	Rhondda U.D.C.	W. J. Jones, Engineer and Surveyor, Public Offices, Pentre, Rhondda.
" 28	Glasgow—Street and Sewer	Corporation	City Engineer, City Chambers, 64 Cochrane Street, Glasgow.
" 30	Willington Quay—Excavating, &c.	Urban District Council	Fleming Davidson, Central Buildings, Walsend.
" 31	Hamilton, N.B.—Roads	Caledonian Railway Co.	Engineer, Buchanan Street, Glasgow.
" 31	London, N.—Road	Lewisham Borough Council	Vigers & Co., 4 Frederick's Place, Old Jewry, E.C.
" 31	London, S.E.—Kerbing	Heston and Isleworth U.D.C.	Surveyor's Department, Town Hall, Catford.
Nov. 2	Hounslow—Paving	Urban District Council	P. G. Parkman, Surveyor, Town Hall, Hounslow.
" 3	Llandudno—Street Extension	Education Committee	E. P. Stephenson, Engineer to Council, Town Hall, Llandudno.
" 3	Walsall—Tar-paving Repairs, &c.	Urban District Council	H. H. McConnell, Architect to Education Committee, Bridge Street, Walsall.
" 8	Southall, Middlesex—Making-up Roads	Urban District Council	Reginald Brown, Engineer, Public Offices, Southall.
Dec. 5	Camberwell—Flints, &c.	Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
No date	Cockermouth—Highway Repairs	Rural District Council	J. B. Wilson, 11 Main Street, Cockermouth.

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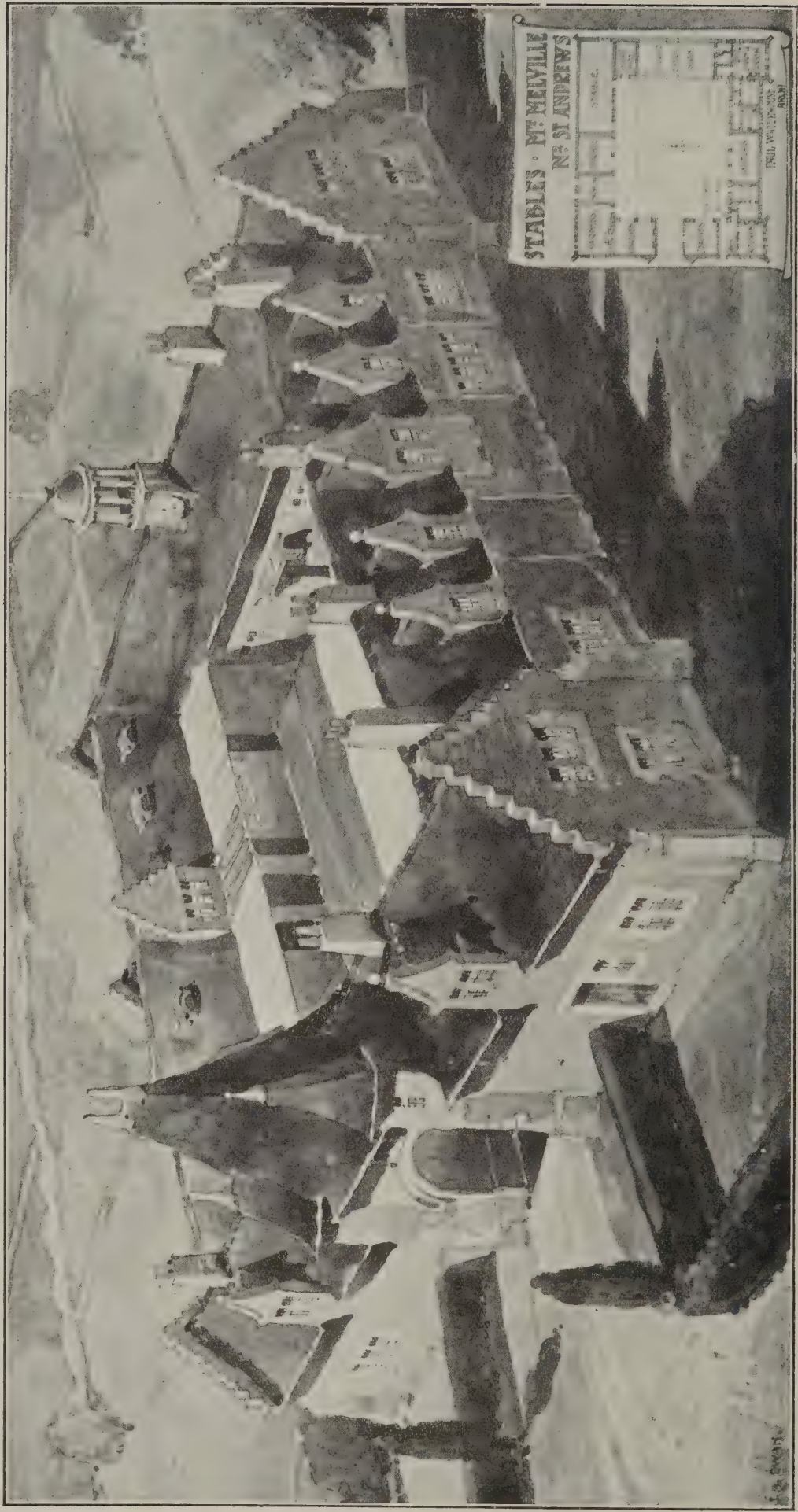
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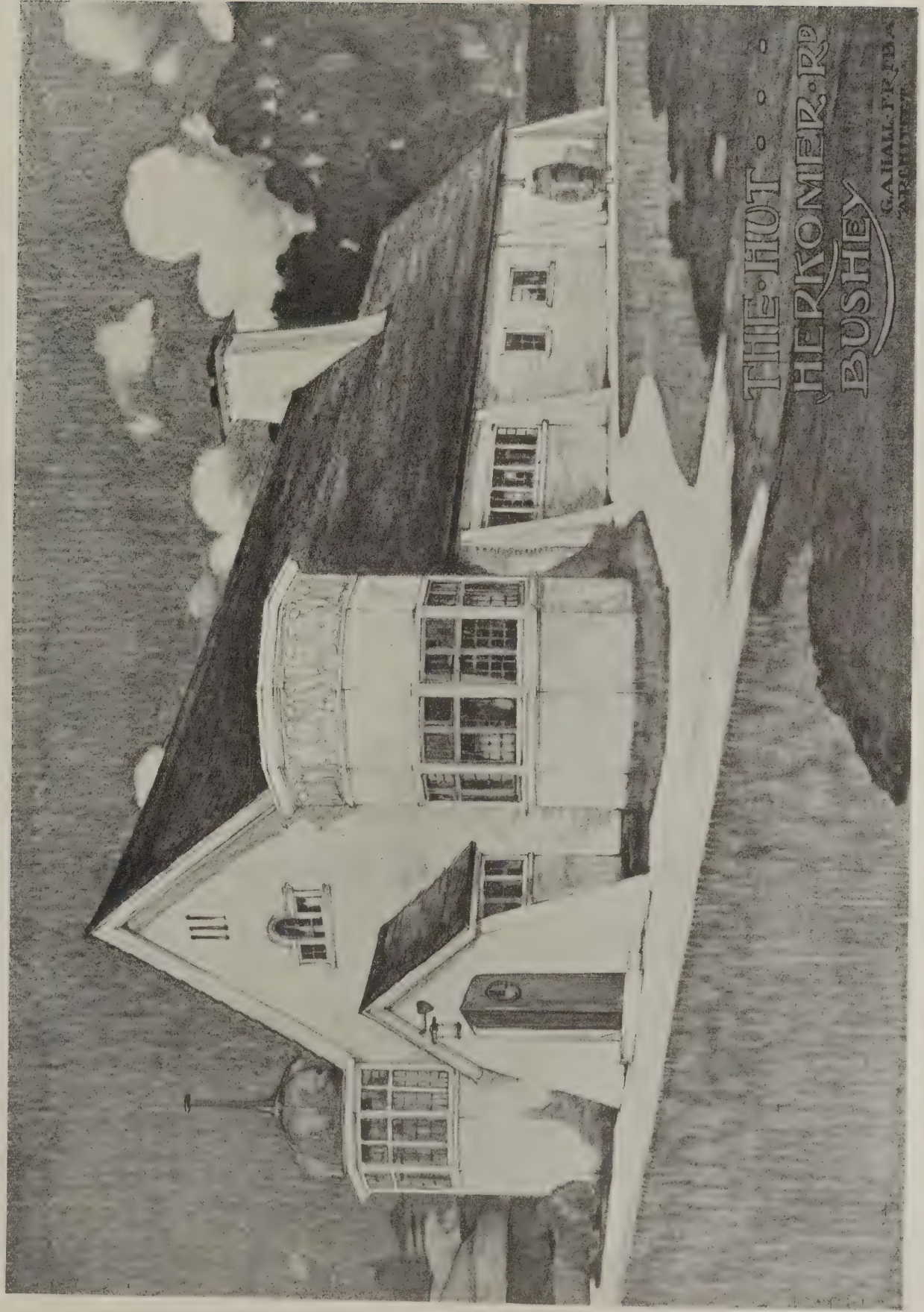
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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, November 2nd, 1904.





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THE

BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

November 2, 1904. Vol. 20, No. 508.

6, Great New Street, Fetter Lane, E.C. 4.

Summary.

In a case heard last week at Birmingham the judge held that measuring was part of the construction of a building, to be treated as such for the purposes of the Workmen's Compensation Act, even though the building might otherwise have been finished weeks before. (Page 231.)

In his presidential address to the Architectural Association of Ireland last week Mr. J. H. Webb said that people seemed to think there was no such thing as an architect in Ireland: it was for them to show that there were men practising in Ireland who were equal to any. (Page 230.)

A grillage plan of the extensive foundations for the Ritz Hotel in Piccadilly is given on pp. 236 and 237, and a photograph of one of the cantilevers on its rocker on p. 235.

An action for libel against the editor of the "Contract Journal" in regard to the Wanklyn-Cooper method of treating sewage has failed. The libel complained of was that the urban district council of Leek had abandoned this system because it did not produce a satisfactory effluent. (Page 231.)

A Manchester jury recommends that the fencing of scaffolds should be made compulsory. Three fatal scaffold accidents are reported this week. (Page 234.)

The New Zealand preferential tariff puts a duty of 4s. per barrel on foreign cement and 22½ per cent. on foreign paperhangings, as against 2s. and 15 per cent. respectively for British-made goods. (Page 234.)

The proposed rebuilding of Lambeth Bridge is estimated to cost £872,000, almost half of which is for the acquisition of property. (Page 231.)

During the past year 81,285 tons of pressed cake have been made at the Bradford sewage works. Action has been taken for the treatment of trade effluents. (Page 238.)

A correspondent says that building work is brisk at Johannesburg and Bloemfontein. At the latter the military have converted Naval Hill into a busy town and rocky veldt into model barracks. Stone-working machinery is in demand. (Page 235.)

Alterations at Exeter College, Oxford, have been made under the direction of Mr. Reginald Blomfield, and at Merton under Mr. Basil Champneys. (Page 230.)

In the grounds of his house at Corfe Mullen, Major George has constructed an ingenious summer-house. It has a domed roof and walls built up of a double layer of roofing tiles floated together in neat cement, with a layer of fencing wire between. (Page 232.)

Traffic Subways.

THE construction of a shallow subway for trams under the Holborn to Strand street is a beginning of what should be regarded as the most promising solution of the traffic problem in large cities. It is intended by such means to connect the northern and southern tram systems of London. The County Council have already decided to make application to Parliament for power to enable them to construct the portion of the tramway subway near Waterloo Bridge. This will involve the removal of the western steps leading down to the Embankment. A shallow tramway scheme similar to this one in London, but on a much more thorough and complete scale, has been adopted for New York. Some particulars of that work will serve to show the possibilities of shallow subways for rapid transit. The New York subway is more than 20 miles in length, with 60 miles of single track, and has cost £10,000,000. The greater part of the tunnel had to be excavated in solid rock and the work done under the streets without stopping traffic: and all the electric conduits, gas and water mains, &c., had to be removed and replaced in tunnels specially provided for them. The route is Y-shaped. For nearly seven miles there are four tracks, the two centre tracks being for express trains. During the day no artificial light for the stations is required, ingress and egress being by means of short straight staircases. The stations, forty-nine in number, are constructed of glazed tiles of various colours, and in emphasizing the names of them the ingenious method of having emblem signs has been adopted: thus Columbus Station has a galley-rigged vessel, Astor Place a beaver, Armoury a military design, Brooklyn Bridge a picture of this structure and two big B's. No advertisements are allowed to disfigure the stations. One of the developments has been the construction of arcades leading to the great stores. The merchants have defrayed the cost of this development themselves, and they are anxious to have the system still further extended. In fact, the subway idea has become so popular that shopkeepers recognize it will increase the value of their property and tend to improve their business. The cars on the railroad seat fifty-two persons, and there is space for as many standing. Special precautions have been taken against fire, the cars being of steel, the windows shielded with copper and the insides finished with aluminium. The subway is being extended to Brooklyn by tunnel under the

East River. The universal 2½d. fare system is adopted. We referred in our issue of October 12th to the subway for goods traffic in Chicago. There is no reason why we should not run goods cars in London on the tram-lines above and below ground, and, if the standard gauge were used for the rails, connections might be made to the various tubes existing and in course of construction with a likelihood of finally solving the traffic problem. We notice that Mr. Allen Baker, chairman of the Highways Committee of the London County Council, strongly advocates a subway from Charing Cross to the Bank and he is presenting a report to the Council on the New York system.

A new Privilege for Readers. To the privileges which regular readers of this Journal already enjoy in respect of free answers to enquiries and a free accident insurance of £500, we now propose to add another. This entitles every reader who has become a subscriber for one year to have a 12-word advertisement inserted free of charge in the Wanted and Miscellaneous Advertisement columns once a month. Such a privilege, so far as we are aware, is not granted by any other technical journal; but it is one which we feel sure will be very much appreciated by readers of all classes. We give prominence to it here so as to ensure all regular readers being informed of the fact. They will doubtless remember and take advantage of it when occasion arises in the future. Those who wish to avail themselves of the privilege immediately should refer to p. xvi of this issue, where a few more details of the scheme are given.

The Topical Builder. A SUBURBAN builder having given the name of "Radium Terrace" to some houses he is building at Twickenham, our contemporary the "Globe" finds occasion for the following verses:—

The enterprising builder who would offer something new
Must abandon Bella Vista and the hackneyed Ocean View;
He must put up something startling that will make the tenant stare—
For instance, X-Ray Gardens or, perhaps, Uranium Square.

Of course, the new diseases sometimes lend a little aid;
I've built Bubonic Terrace and Insomnia Parade,
Enteric Park—the very name is killing off the rats—
And Beri-Beri Mansions and Appendicitis Flats.

Without the Far East war I could not have got on at all,
It gave me Banzai Buildings and Rodjestvensky Hall;
There's Sha-ho Gardens—and it only took a little "nous"
To name Kuroki Cottages and Kuropatkin House.

A.A. OF IRELAND.

President's Fighting Speech for Irish Architects.

MR. J. H. WEBB delivered his presidential address to the Architectural Association of Ireland last week. He said that primarily they existed for architectural education. It was their hope that they might be able to establish a school in Ireland where a student could obtain that supplemental education which was universally acknowledged to be necessary if he were to become a really qualified architect. At the present time, on the other side of the Irish Sea, an attempt was being made to formulate a scheme by which all existing schools of architecture would be brought under the superintendence of a head board or governing body, which board would be in close alliance with the Royal Institute of British Architects, and, as a matter of fact, would consist mostly of Fellows of that body (at least that was the proposal of the Institute). As president of the Architectural Association of Ireland he was nominated by the R.I.A.I. to attend a preliminary meeting of the board in London, which he did. He thought it might be possible that some benefit might accrue to the English student, possibly even to the provincial English student, by the operations of this board, but it was more than doubtful that it would be of benefit to them in Ireland. Any set of conditions or requirements suitable for

England would be altogether unsuitable for Ireland. What they wanted in Ireland was a little self-reliance. What they ought to do was to follow up their policy of last year and endeavour to persuade their own Institute—the Royal Institute of Architects of Ireland—to formulate a proper and suitable examination, an examination based on the knowledge required by an architect practising in Ireland, such an examination as could be passed by one of their leading architects without it being necessary for him to read up a lot of extraneous subjects, and certainly an examination without catch questions. There was no body fitted to draw up and work such an examination but an Irish body, and no body in Ireland so fitted as the Council of the Royal Institute of the Architects of Ireland. The principle of having an examination had already been agreed to and passed by a general meeting of the Institute, which action had placed that body in rather a difficulty with the British Institute, to which it was affiliated; but their Institute ought to be encouraged by every means in their power to establish an examination of their own. Brought up in Dublin in an architectural atmosphere, as it were, and conversant from babyhood with fine examples of Classic work, erected mostly in the time of Grattan's Parliament, surely they ought to have it in their blood to do good work if they were given the chance: but unfortunately it seemed to be the opinion of not only their neighbours but of their own

public that there was not such a thing as an architect to be found in Ireland, so that whenever a building of any style or magnitude was to be erected a foreign "expert" was employed and sent touring the kingdom and the Continent examining examples of the work he was supposed to have at his fingers ends. It was for them to make such a state of things impossible by using every means in their power to perfect themselves in their art, and then to show their countrymen by means of competitions or otherwise that there were men practising in Ireland who were equal to any.

ALTERATIONS AT OXFORD COLLEGES.

DURING the past year extensive alterations have been made at some of the Oxford colleges. The following particulars describe the chief works carried out:—

Exeter College.

The old panelling in the hall of this college has been taken down, cleaned of paint, restored, and heightened with new panelling. The stone chimney-pieces have been replaced by two in oak and Hopton Wood stone. The beautiful Elizabethan screen has had its paint removed and been thoroughly restored. The old stone floor has been taken up and a new floor of Hopton Wood stone, with black marble squares, laid down: and the roof and walls have been re-decorated. The work has been carried out by Messrs. Symm & Co. The chimney-pieces were executed by Mr. Aumonier, the architect being Mr. Reginald Blomfield, M.A.

Merton College.

At this college very extensive additions to the accommodation for undergraduates are being carried out. In the first quadrangle a building is in course of erection which will provide eleven sets of rooms, while on the east side of the Fellows' quadrangle alterations have been effected by which nine sets of rooms have been added. New staircases of stone have been built. Mr. Basil Champneys is the architect.

University College.

The work in connection with the hall of University College has been continued during the Long Vacation, the lengthening of the building having been executed during 1903. The plaster ceiling, which covered up the fine old oak roof, has been removed, and it was discovered that the oak timbers were in an unsound condition. It became necessary to remove the whole of the roof, reconstructing it with new timbers for the trusses, using some of the old ribs, queen-posts, rafters, &c., showing that the roof is restored to its original design. It is covered with oak boarding and Stonesfield slating. The work has been carried out by Messrs. Symm & Co. under the directions of Mr. H. Wilkinson Moore, architect, of Oxford.

DRAWINGS OF ARCHITECTURE.

WE give this week three pencil drawings by Mr. Gerald Warren. That of Kingston Church, on the opposite page, is reduced from a large drawing; the other two are taken from a sketch-book. All three are suggestive in treatment, with just enough crisp lines to give life to the softer tones. Pencil drawing has no strong attraction for the average person; there is a quietness about it which does not lend itself to brilliant effects such as the black and white draughtsman working for the illustrated press has made familiar. Nevertheless pencil retains its own distinctive quality, and those who can appreciate this will be interested in the three drawings here presented: and also in the drawing of "The Hut," Bushey, reproduced in the centre plates.



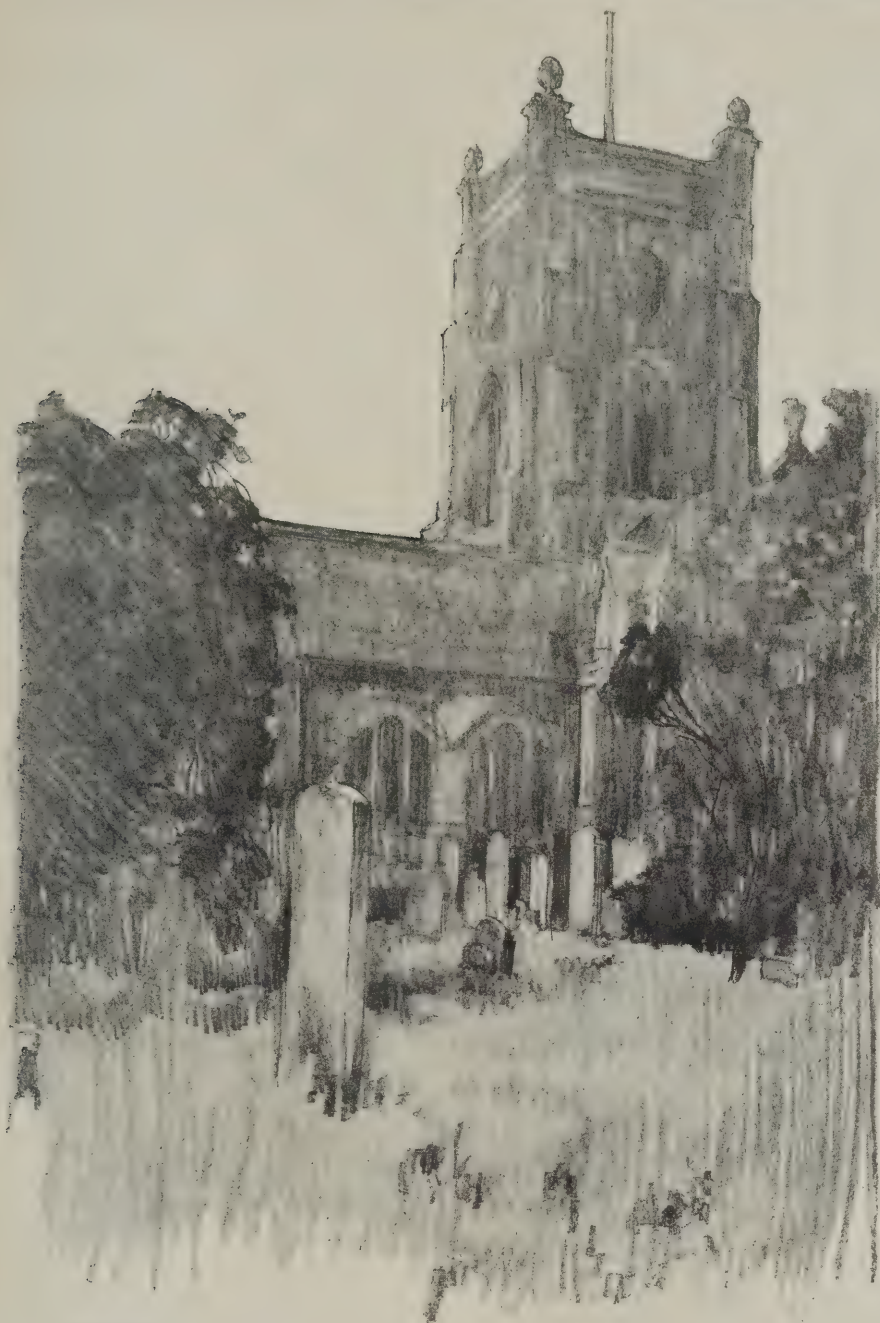
A SKETCH AT COVEHITHE, NEAR SOUTHWOLD, SUFFOLK, BY GERALD WARREN.

Law Cases.

When is a Building Complete?—At the Birmingham County Court last week a workmen's compensation case was heard in which the point in question was as to whether a building was completed when it had still to be measured. A plumber named Plant brought the action against his employers, Messrs. J. S. Wright & Co., who had a sub-contract for plumbing work with Messrs. Whittall, builders, at a factory in Lancaster Street, Birmingham, which was being erected for Messrs. Rawlins. On May 26th last, the day of the accident, the builders had practically completed their work; a few small jobs only remained to be done before they finally quitted. Messrs. Wright & Co., however, had not finished the plumbing work. On the day of the accident the actual work had been completed to this extent—it had to be measured up before Messrs. Wright & Co. could leave the job; and it was while engaged in measuring up that Plant slipped and fractured his right arm, being incapacitated for thirteen weeks. The builders had removed their own scaffolding, but some remained that was erected by the owners of the building to fit up plant and machinery. —In cross-examination Plant said the actual plumbing work was finished a fortnight before the accident. Messrs. Rawlins had taken possession, but had not yet got their plant down.—Counsel for respondents said that the scaffolding was used by Messrs. Rawlins for putting up the steam pipes. He contended further that there was no scaffolding on the premises belonging to the contractor or sub-contractor; the premises were in the hands of a third party; and therefore there could be no liability on the part of the respondents.—Three points had been raised, said the judge: (a) that Messrs. Rawlins were in possession, and therefore the building was not any longer a factory where plant was working; (b) that the building was completed when the accident happened, and that it was no longer in course of construction; (c) that measuring, although it might be the conclusion of the construction, was not part of the construction. The last point, said his Honour, was really to him the point in question. He held that the measuring-up—though not done until a fortnight after the building was completed—was part of the construction, and therefore the case was within the Act. There might be cases in which the interval of time was so long as to make it unjust to regard it as part of the construction, but such cases would have to be considered on their merits. He did not regard a fortnight as an unreasonable time, and therefore he gave an award for £11, the amount agreed upon by the parties.—On an application by counsel, he said the respondents had a right to appeal.

Abortive Action for Libel against the "Contract Journal."—The case of *Wanklyn & Cooper v. Biggs* was heard in the King's Bench Division of the High Court of Justice last Wednesday. This was an action brought by Prof. J. A. Wanklyn and Mr. W. J. Cooper, who are the proprietors and patentees of an improved process for the aeration and purification of sewage, generally known as the Wanklyn-Cooper process, to recover damages for libel. In March, 1903, the plaintiffs granted to the urban district council of Leek a licence to use their process for the purification of sewage matter flowing from the southern drainage district of the council. On October 21st, 1903, the defendant, who is the editor of the "Contract Journal and Specification Record," published in that journal the following, which was complained of as a libel:—"Leek.—The surveyor has received instructions to consider the question of sewage-disposal in the south district, in order to meet the requirements of the county

B



DRAWINGS OF ARCHITECTURE: ST. LUKE'S CHURCH, KINGSTON-ON-THAMES,
BY GERALD WARREN.

LAMBETH BRIDGE.

Proposal to Rebuild at £872,000.

AT last week's meeting of the London County Council the Bridges Committee presented a report recommending that application be made to Parliament in the session of 1905 for powers to enable the Council to undertake the reconstruction of Lambeth Bridge.—The suggested design shows a steel structure on granite piers. With a bridge of 60ft. wide it will be possible to obtain gradients of 1 in 30, which compare favourably with the present gradients. The estimated cost of the scheme is £872,000, of which £410,000 is for the acquisition of property.—Lord Welby, on behalf of the Finance Committee, moved that the recommendation be referred back. He said that the council had already undertaken an expenditure of about £2,000,000 for works which were being carried out by the Bridges Committee, and during the current and the two following years an annual expenditure of approximately £450,000 would have to be met; and until these schemes were nearing completion the Council should not commit itself to further capital expenditure for

bridges and tunnels.—Mr. Beachcroft said it was scarcely creditable to London that its bridges should be allowed to get into disrepair. He hoped they would do something. If they could not see their way to reconstruct the bridge, it should be immediately put in a proper and safe condition to meet the needs of the people who lived near it.—Colonel Rotton said that no doubt Lambeth Bridge was in a dangerous condition and required attention, but whether they could spend some £900,000 upon it was a matter which required consideration. He should support the amendment on the condition that when the character of the Westminster improvement was decided upon the improvement of Lambeth Bridge should be discussed.—Mr. Ward said that some years ago they had called in Sir Benjamin Baker, who told them that the bridge was dangerous. It was then patched up. Now their engineer came to them again and said that the bridge was dangerous. It was the duty of the Council to say that the bridge should be reconstructed as soon as possible.—After further discussion the amendment was carried and the recommendation accordingly referred back to the committee.

council with regard to the quality of the effluent. The council have abandoned the Wanklyn-Cooper method of treating the sewage because of its failure to produce a satisfactory effluent." The plaintiffs complained that by reason of the alleged libel they were prevented from granting further licences, and so obtaining profit out of their invention. The defendant pleaded that there was no libel; that in so far as that words consisted of allegation of fact they were true, and in so far as they contained expressions of opinion they were fair comment on a matter of public interest. The plaintiff, Professor Wanklyn, gave evidence refuting the alleged libel, and he was subjected to a long cross-examination to show that what the defendant had published was true.—At the close of the plaintiffs' evidence the jury stopped the case, stating that they thought it was fair comment.

Views and Reviews.

Old Furniture.

In spite of the artistic (!) triumphs of Cur-tain Road, the seductive influences of the furnishing companies with their cheap suites, and the propagation of the new art ethics, the majority of educated people prefer the furniture of their forefathers, not merely because it is true and sound but because it is more artistic and more congenial as an

essential in the home. So much is this so that the better class of modern manufacturers find it pays to reproduce the old patterns and to produce new designs in quiet simple styles. But the genuine old furniture is still preferred: the farmhouses and cottages have been denuded of their treasures by the wily dealers; authentic pieces have been quickly snapped up at the country auction sales; and the never-failing demand is but poorly met by an ever-decreasing supply. The dearth of good old-fashioned furniture has led to such an increase in prices that it is becoming profitable to make and fake furniture in imitation of the old, and to sell it, modern wormholes and all, to a confiding public. Mr. Litchfield's knowledge as a dealer enables him to give much information to the unwary collector that will save him from loss and disappointment, and his two chapters on "Faked Furniture" and "Hints and Cautions" are of themselves sufficient to make the book valuable. The first part of the volume contains an instructive treatise on the essential features of the different styles, written for the amateur.

"How to Collect Old Furniture," by Frederick Litchfield. London: George Bell & Sons, Portugal Street, W.C., price 5s. nett.

New Streets.

This little work will be found very useful by all who have to deal with the formation and making-up of new streets. The legal questions involved, especially in regard to

apportionment of costs on the frontagers, and the work that the speculative builder or estate developer can be called on to do, are on a very insecure footing, and some new legislation is urgently required. The majority of authorities prefer to rely on sections 150, 151 and 152 of the Public Health Act, 1875, rather than adopt the Private Street Works Act, 1892, which, though expressly promoted to solve the difficulties of the question, has generally proved unworkable in the places where it has been tried. Mr. Allen gives plans, specifications and quantities for making up a road, copies of the various legal and other forms and notices, excerpts from legal decisions and a quantity of useful memoranda. The book will be valuable to official engineers.

"New Streets: Laying-out and Making-up," by A. Taylor Allen. London: Sanitary Publishing Co., Ltd., 5, Fetter Lane, E.C., price 3s. nett.

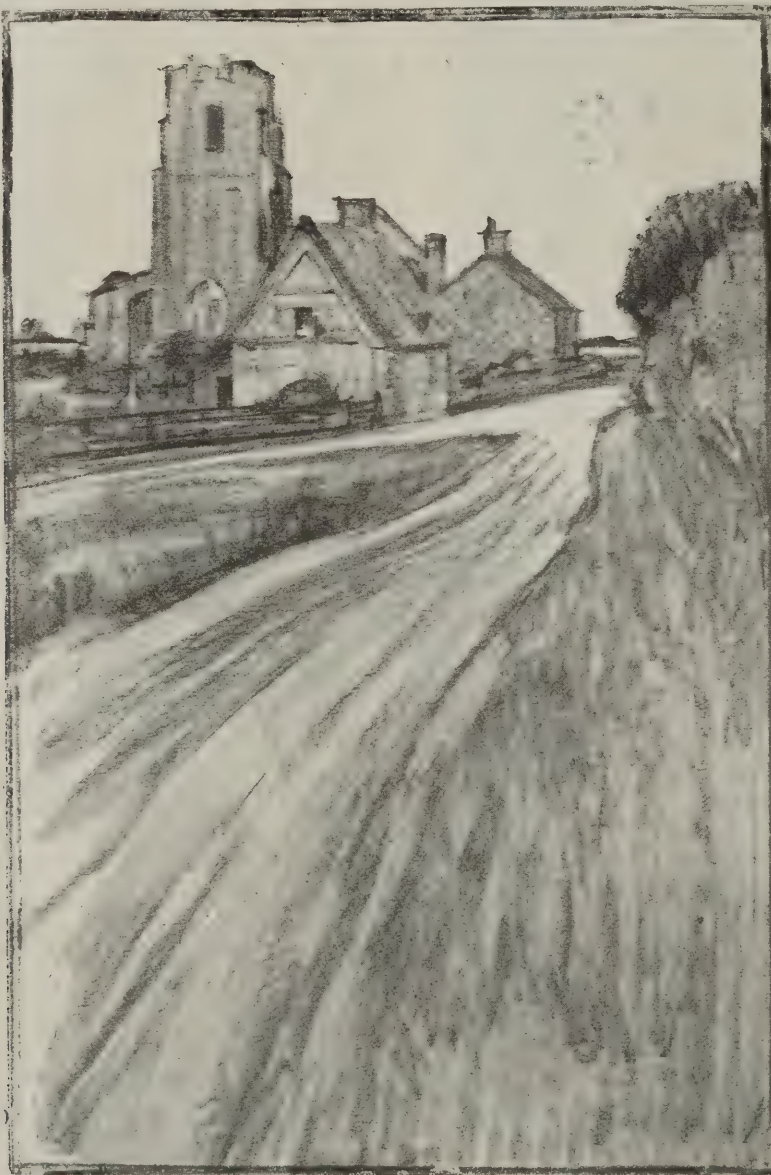
Mr. Day's Latest Book.

If it were not for the fact that this book replaces others now out of print we should say at once that Mr. Day had written enough about pattern and ornament. After half a dozen volumes we have become perfectly familiar with his treatment of the subject and, at first sight, his latest book looks very much like the others. The treatment, however, is a very excellent one, and the illustrations are selected with great discrimination; especially useful are those which have been redrawn for the purposes of this book; they bring out just those features and constructive details which are essential to the design. The illustrations range over a wide sphere, embracing such diverse objects as wood-carvings and lace, shields and ivories, damasks and stoneware jars, velvet and Japanese fans. But they are not inserted jumble fashion. They all illustrate some particular treatment and are more or less contrasted with one another to show how the designer has embellished his surface or got over a technical difficulty. This book covers the ground of "The Application of Ornament" and includes what seemed to the author worth preserving in "The Planning of Ornament," but it goes further than either of the volumes it supplants. "It shows, in fact, the intimate relation of design to workmanship, and the effect which material and ways of working have had, and must naturally have, upon design, and illustrates it by a number of examples, in which there is no mistaking the influence, not only of material upon the treatment of design, but of the tool or process used in working it." Historic ornament is touched upon lightly and there are continual references to the ethics of the art, but primarily the book is practical in its aim, serving to teach the designer the technicalities and restrictions of applied ornament. It is beautifully produced and illustrated, and will be found of the greatest value and interest to all concerned with ornament and its application. Moreover, considering its quality and size, it is exceedingly cheap.

"Ornament and Its Application," by Lewis F. Day. London: B. T. Batsford, 94, High Holborn, W.C., price 8s. 6d. nett.

NEW USE OF AN OLD MATERIAL.

AN extremely original and interesting piece of construction came under my notice while staying this summer at Corfe Mullen, Dorset. It is situated in the beautiful grounds surrounding the residence of Major C. A. George, J.P., for many years senior partner in an important firm of builders at Bournemouth, who is now devoting his leisure and experience to the constant improvement of his house and gardens. Among many other clever devices contrived by Major George (chiefly through the medium of cement), perhaps the most interesting is the summer retreat illustrated by the accompanying drawing and photograph. These



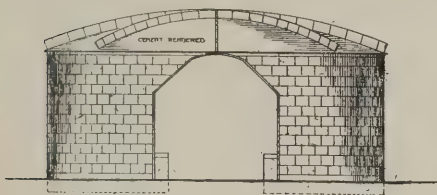
A SKETCH AT COVEHITHE, BY GERALD WARREN.

clearly indicate the general arrangement; but it may be well to explain that (above the level of the concrete base) the walls and dome are constructed of nothing but a double layer of ordinary roofing tiles, finished to a total thickness of in., the two tiles being floated together in neat cement and laid so as to break every joint in a vertical direction. One strand of fencing wire placed between the layers of tiles and carried round near the top of the walls as shown is the only additional material or support used in the whole structure. Even the concrete seat and sloping tile back are unnecessary for its stability, as these were erected much later than the other portions of the work. The construction of the dome is shown by the roof plan. The main flat ribs or panels, three tiles wide, were first turned across in the order as figured, namely, 1, 2, 3, 4, the same centre being used for each. The remaining spandrel pieces were then filled in on rough boards, which were struck when the work had properly set. The external ribs (also of tiles bedded in cement) were added to act as stiffeners to the dome, and also to facilitate the climbing of creepers over its surface. The dome is rendered externally in cement, and four small squares of glass admit light to those portions of the interior farthest removed from the entrances. The result is a happy combination of elegance and strength, forming a cool and airy retreat from the summer sun or rain, placed invitingly across one of the many shady paths leading from the designer's residence. On the tower of the latter is another example of this peculiar mode of construction—in the form of an "all the year round" shelter placed on the concrete flat of the tower. The pent roof and partitions are formed of a double thickness of tiles as before, resting on a brick-on-edge base, with concrete seats, as shown on the drawing. It will be noticed that the flat roof has no support beyond the partitions beneath; thus the overhanging portions are entirely self-supporting and, further, safely held two men moving freely over the whole surface whose combined weight amounted to at least 22 stone.

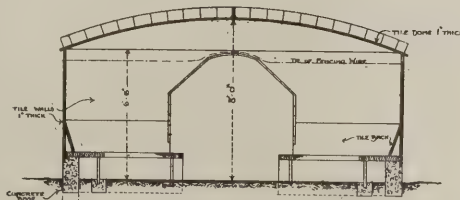
C. R. T.



A NOVEL SUMMER-HOUSE CONSTRUCTED OF TILES AND CEMENT.



- ELEVATION -



- SECTION -

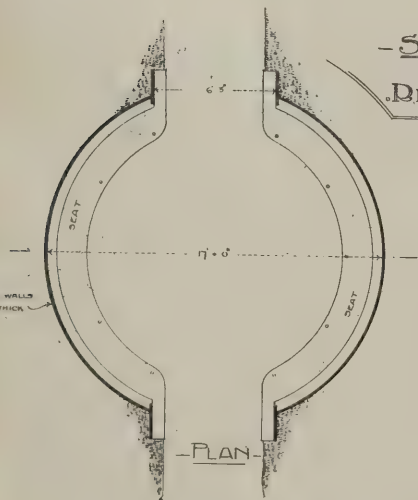


- SECTION THROUGH ENTRANCE -

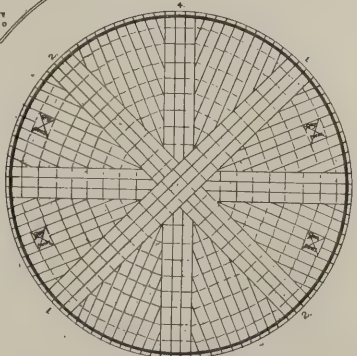
- A -

- SUMMER -

RETREAT.

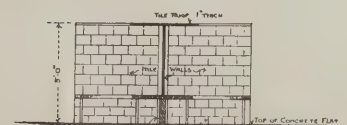


- PLAN -

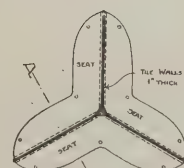


- ROOF PLAN - LOOKING UP -

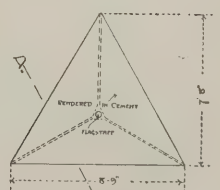
- A-SHELTER -



- SECTION AA -



- PLAN -



- ROOF PLAN -

SCALE 0 1 2 3 4 5 6 7 8 9 10 FEET

Builders' Notes.

Messrs. G. Woolliscroft & Son, Ltd., of Hanley, have been awarded a gold medal for wall-tile decoration, floor tiles and faience (the latter including faience gas stoves) at the St. Louis Exhibition.

Jury recommends Compulsory Fencing of High Scaffolds.—An inquest was held last week by the city coroner of Manchester into the cause of the death of William Birkell, a bricklayer's labourer, who fell from a scaffold at the new school in Alfred Street, Harpurhey. It was stated that a block of terra-cotta became dislodged by another which was being lifted by a crane, and fell on the scaffold platform on which Birkell was standing. The scaffold was 30ft. high, but there was no handrail to it. The coroner commented on this fact, and the jury, in returning a verdict of accidental death, added a recommendation to the effect that in view of frequent accidents owing to the absence of fencing on scaffolds such provision should be made compulsory.

Preferential Tariffs to New Zealand.—Under the amended New Zealand Tariff, manufacturers of the British Dominions are accorded a preference ranging from $2\frac{1}{2}$ to $33\frac{1}{2}$ per cent. over foreign manufacturers. The tariff includes the following:—

Goods.	Rate of Duty.	
	British Dominions.	Foreign.
Cement - - - per barrel	2s.	4s.
Furniture - - - - -	25 per cent.	$37\frac{1}{2}$ per cent.
Glass - - - - -	2s.	3s. per roof.
Iron nails - - - - -	2s.	3s. per cwt.
Iron pipes - - - - -	5 per cent.	$7\frac{1}{2}$ per cent.
Paperhangings - - -	15 per cent.	$22\frac{1}{2}$ per cent.
Gas and oil engines -	Free	20 per cent.
Iron and steel cordage -	"	"
Iron - - - - -	"	"
Rails for rail and tramways	"	"

Those who wish to advertise in New Zealand papers should apply to Mr. R. B. Brett, 2 and 3, Imperial Buildings, Ludgate Circus, E.C.

Fatal Building Accidents.—Whilst painting the cross on the Twelve Apostles R.C. Church at Leigh on Friday a young workman named Hodgkinson, aged 24, was dashed to the ground through the slipping of the cat ladder. Two other workmen were on the roof at the time, but managed to preserve their balance. —At Kensington on Friday a jury returned a verdict of "accidental death" concerning a scaffolder's labourer named Smith, also aged 24, who was killed at the new buildings of the Victoria and Albert Museum. Deceased looked over the side of a high scaffold preparatory to starting work for the first time; he immediately fainted, and fell to the ground 50ft. below.

Mr. Heathman's New Factory.—The new factory of Mr. J. H. Heathman at Parson's Green, Fulham, S.W., is now in full working order. There are three blocks. Block No. 1 has a shop 50ft. by 30ft. by 30ft. high for the fire-escape and telescopic ladder tower constructors, a pump and fire-engine shop 64ft. by 20ft., a paint shop 64ft. by 16ft., a store-room 30ft. by 20ft., and a receiving and despatch office of similar size, with a shop 212ft. by 20ft. on the first floor for the making of Heathman's patent telescopic ladders, steps, trestles and portable scaffolding. Block No. 2 comprises a mill-room 74ft. by 58ft. fitted up with most complete machinery for converting timber, the builders' ladder workshop (equipped with power saw and planes for splitting and planing ladders and poles up to 80ft. long), a special shop for the manufacture of hand-carts and trucks, room for making and repairing hose of various descriptions, space for metal-turnery, with machines and tools for finishing couplings, hydrants, nozzles, &c., and two blacksmiths'

shops. Block No. 3 has two floors 46ft. by 24ft. by 16ft. high and is devoted to stock and showrooms and the preparation of canvas chutes and rope fire-escapes. The goods entry and egress is from 10, Parson's Green, but the general office and foremen's entrance is at 72, Rectory Road. The premises at 37, Endell Street, Long Acre, and also at 7, Pentonville Road, Islington, are continued as stock and showrooms for the convenience of customers who would not find it convenient to visit the Parson's Green premises.

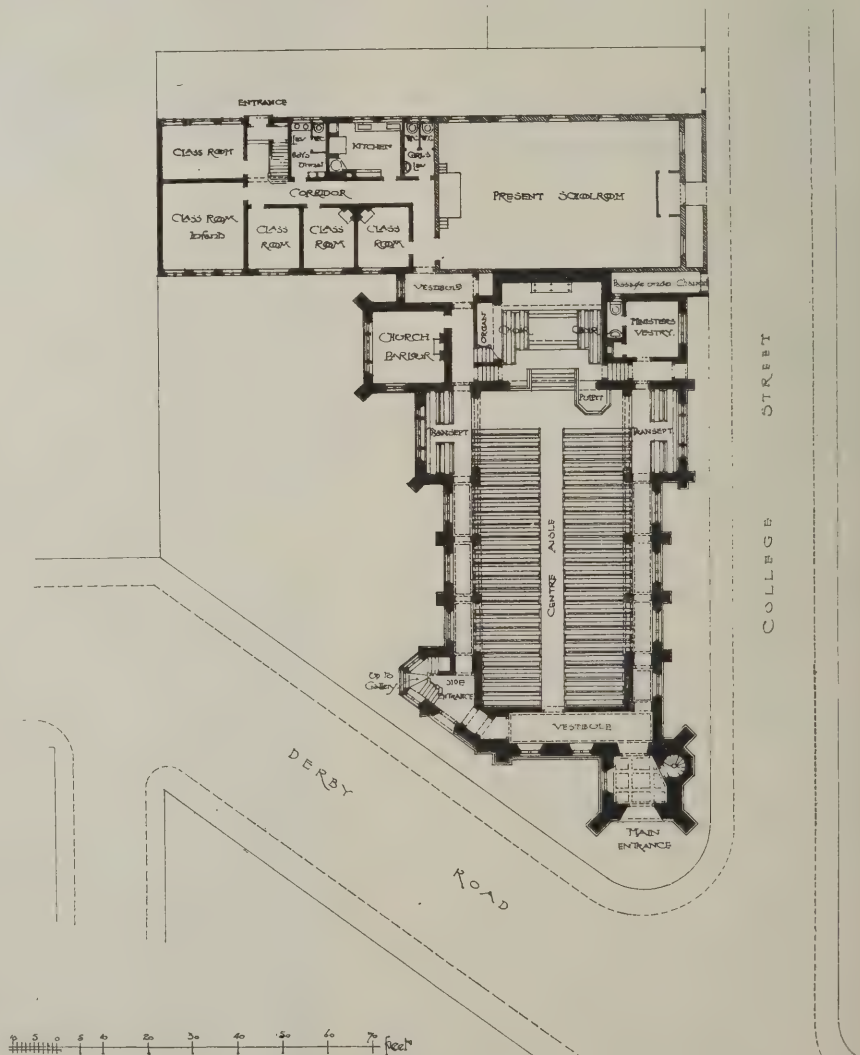
OUR PLATES.

THE new Wesleyan church and schools at Long Eaton have been completed during the last few weeks. The new school buildings, comprising eleven classrooms, with kitchen and lavatory accommodation, are shown to the left of the illustration. The exterior is of sand-faced red bricks, with Westmorland green slates on the roofs, and the windows in oak painted white, with lead lights. The church is erected of hammer-dressed Coxbench stone, with white Hollington stone dressings for the windows, doors, &c., the roof being of English oak covered with green Westmorland slates. The interior is built with Congrit and Corsham Down Bath stone. The chancel is raised about 5ft. above the level of the nave floor and is carried out entirely in black, green and white marbles, with richly traceried oak pulpit, screens, &c.: for a height of 12ft. it is panelled in oak. The chancel seats are also in oak. The contractors for the schools were Messrs. Henry Vickers & Son, of Nottingham, and the general contractors for the church Messrs. Pask & Thorpe, of

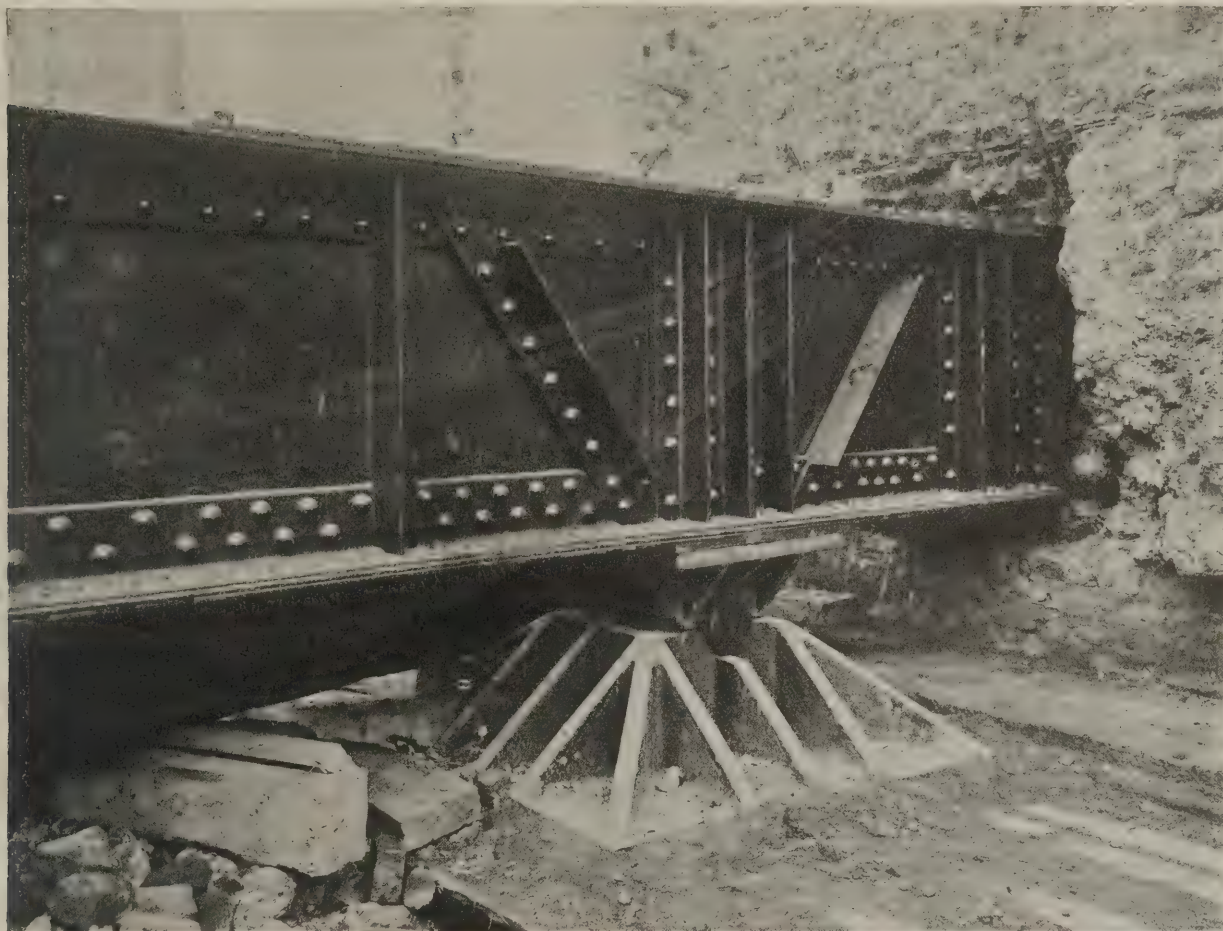
Nottingham, the heating being carried out by Messrs. Danks & Co., engineers, Nottingham, and the ventilation by Messrs. Ashwell & Nesbit, Ltd., of Leicester. The architects for the whole scheme were Messrs. Brewill & Baily, of 44, Parliament Street, Nottingham.

"The Hut," Herkomer Road, Bushey, was erected for Miss Edith Hardy, an artist of growing reputation. As the drawing indicates, the house is built of brick, rough-cast, with a green slated roof. The studio is 25ft. by 24ft., with a gallery at one end. The octagonal projections on the right and left are entered from the studio: one is an alcove for reading or working, and the other a fernery with a glass roof. Kitchen, scullery, two bedrooms, bath, &c., are all provided on one floor. The building cost £800. Mr. George A. Hall, F.R.I.B.A., was the architect, and Messrs. Tyler & White, of Watford, were the contractors.

The stables at Mount Melville, near St. Andrews, Fife (for Mr. James Younger), are being erected in rubble masonry from the local quarries, with dressings of the same. The roofs are covered with local curved red tiles, small flat Alloa tiles being used for the steep roofs above the entrance gateway. The buildings surround three sides of a court, the centre portion being left for future completion. At the south-west and south-east angles are cottages for the coachmen, the grooms having rooms between. The work is being carried out not by a single contractor but by representatives of the various trades under the superintendence of the architect, Mr. Paul Waterhouse, F.R.I.B.A., who is also engaged upon the completion of the house to which the stables belong.



WESLEYAN CHURCH AND SCHOOLS, LONG EATON. BREWILL AND BAILY, ARCHITECTS.



THE RITZ HOTEL, PICCADILLY.—ONE OF THE FOUNDATION CANTILEVERS.

Correspondence.

"American Building Methods."

To the Editor of THE BUILDERS' JOURNAL.
EXETER.

SIR,—Under the above heading in your issue for October 5th Mr. James A. Smyth calls attention to the columns at the new cathedral of St. John, New York, which are in two pieces. When last I went over this long-spun-out job the columns were not in position, but photographs I have seen since make them fairly familiar to me. Monoliths we always admire, and huge columns built in courses, from three upwards, are always dignified; but is it not wretched construction to have columns, however large, with a single joint?—Yours truly, HARRY HEMS.

Architecture and Building in South Africa.

To the Editor of THE BUILDERS' JOURNAL.
JOHANNESBURG.

SIR,—As a subscriber to your most interesting journal, I wish to correct a statement made in answer to a correspondent under the heading of "Situations in South Africa" in your issue for August 31st. You state that there is no journal for the building trades published in South Africa. About a month ago a journal came into being called "The South African Building News and Contractors' Journal," and from what I can gather it has come to stay.

It may interest you if I deal briefly with the strides made in building in this country since the war, more especially in Johannesburg. That the mining magnates are optimistic as to the future of the Rand is evident by the magnificent offices they are building. Eckstein's new building, now nearing completion, would compare more than favourably in point of size or magnificence with any offices in London, and the Carlton Hotel, the new Stock Exchange, the

Rand Club and the General Mining Buildings will be a credit to the town as well as to the architects. The mushroom-like growth of the suburban residences is such as can only happen in a mining town, but here, different to most mining towns, the buildings are substantial. The enormous growth of the suburbs is greatly due to the wheel and motor car; nowhere is there such a large percentage of bicycles to the population as in Johannesburg. Bloemfontein, the capital of Orangia, has also gone ahead in the building line, and several very fine hotels have been built within the last two years. Messrs. Pauling & Co. have secured the contract for the "sluit scheme" there, made necessary by the disastrous flood about a year ago. The military, however, have brought about the greatest change in Bloemfontein, having converted the summit of Naval Hill into a busy town of several thousands of inhabitants—a stupendous work that has impressed the Dutch element more than anything we have done. At Tempe (three miles from Bloemfontein) the military have also built barracks for several thousands of soldiers. What was some time ago rocky veldt is now converted into model barracks. The work of levelling the streets and making playgrounds was a great undertaking.—Yours truly,

HAROLD JAMES,

late Lieutenant 22nd Battalion I.Y.

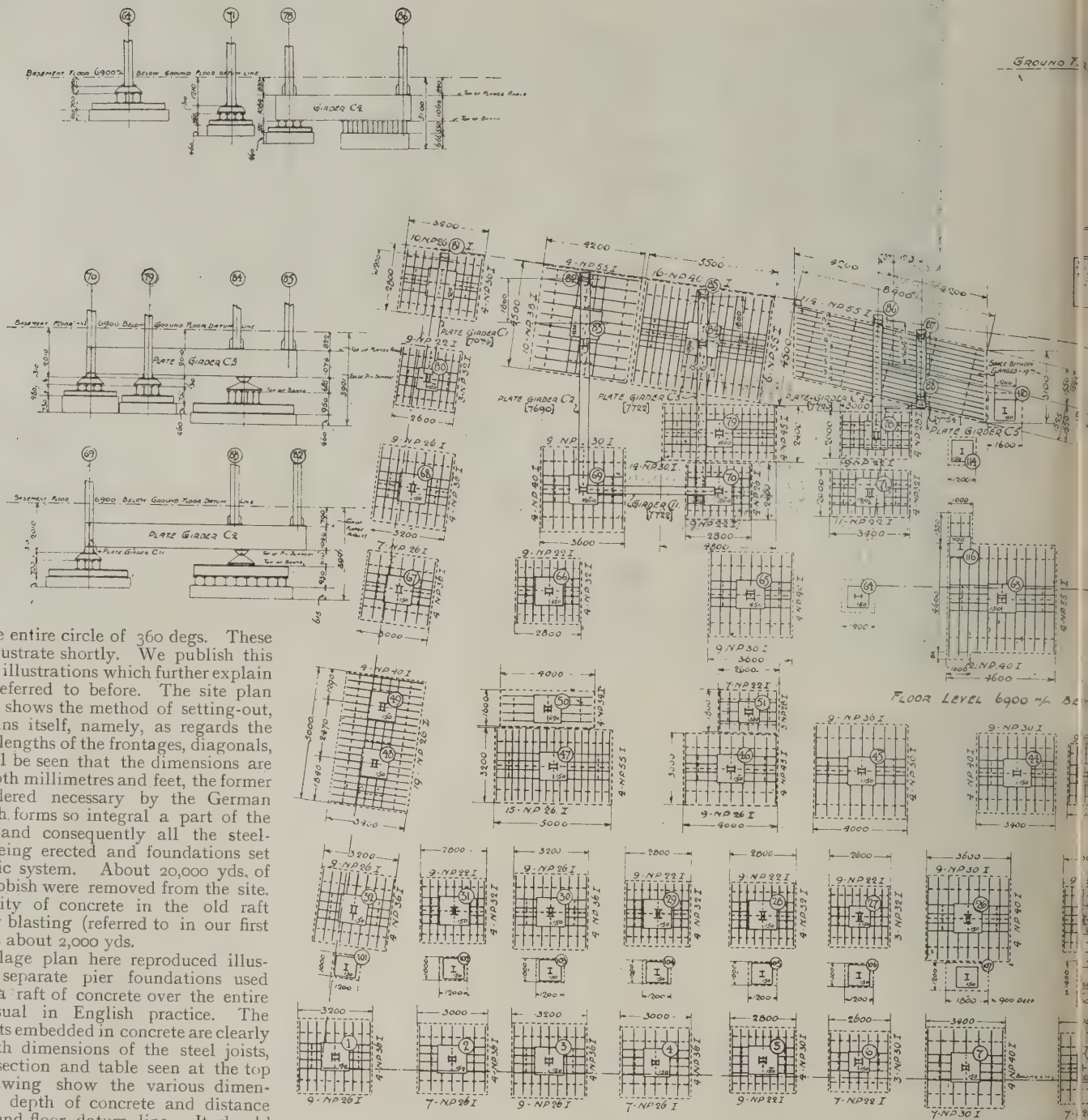
September 26th, 1904.

[An enormous quantity of building stone is now annually imported into South Africa but in view of the ample supplies the country itself possesses there has for some time been a growing opposition to using the imported material, and with the developments now on foot there is little doubt that Colonial building stone will rapidly replace the foreign article, and that a powerful impulse will be accorded the industry. An increased demand for stone working and quarrying plant and equipment is therefore likely to be assured

those manufacturers who are quick to realize the present trend of sentiment and to exploit the prospects now opening up. The Building Committee of the new University has already agreed to call for tenders for various South African stones, and it is likely that the example recently set by the South African College will be generally followed not only at the Cape but throughout the whole of South Africa. Many of the Colonial stones, such as Steenpan and Queenstown, exist in abundance, and are of excellent wearing quality, rich in colour and remarkably easy to dress.—"South Africa."]

THE RITZ HOTEL.

IN our issue for September 28th we published several photographs of the Ritz Hotel, Piccadilly, W. The job has progressed rapidly since then. The steelwork has risen almost all over the site to the ground-floor level, through the basement and sub-ground floors respectively. There are 603 beams on the ground floor and 303 on the sub-ground floor, the difference being due to some of the rooms being higher and going through the two storeys. There are eighty-eight large stanchions and thirty-three smaller ones, with struts of course in addition. Altogether, up to last Saturday about 550 tons of steel had been put in position, and there is a large quantity lying on the ground waiting to be erected. The steel is German manufacture from the Burbacher Hütte. The inclined track for carts used in clearing the site has been removed and the foundations of the piers on the portion of the site occupied by this run-way are being put in. There is a large crane of English pattern which has done good service in connection with the steelwork, but a derrick of American pattern specially constructed for the builders is being used with conspicuous success: it has the advantage that its arm swings



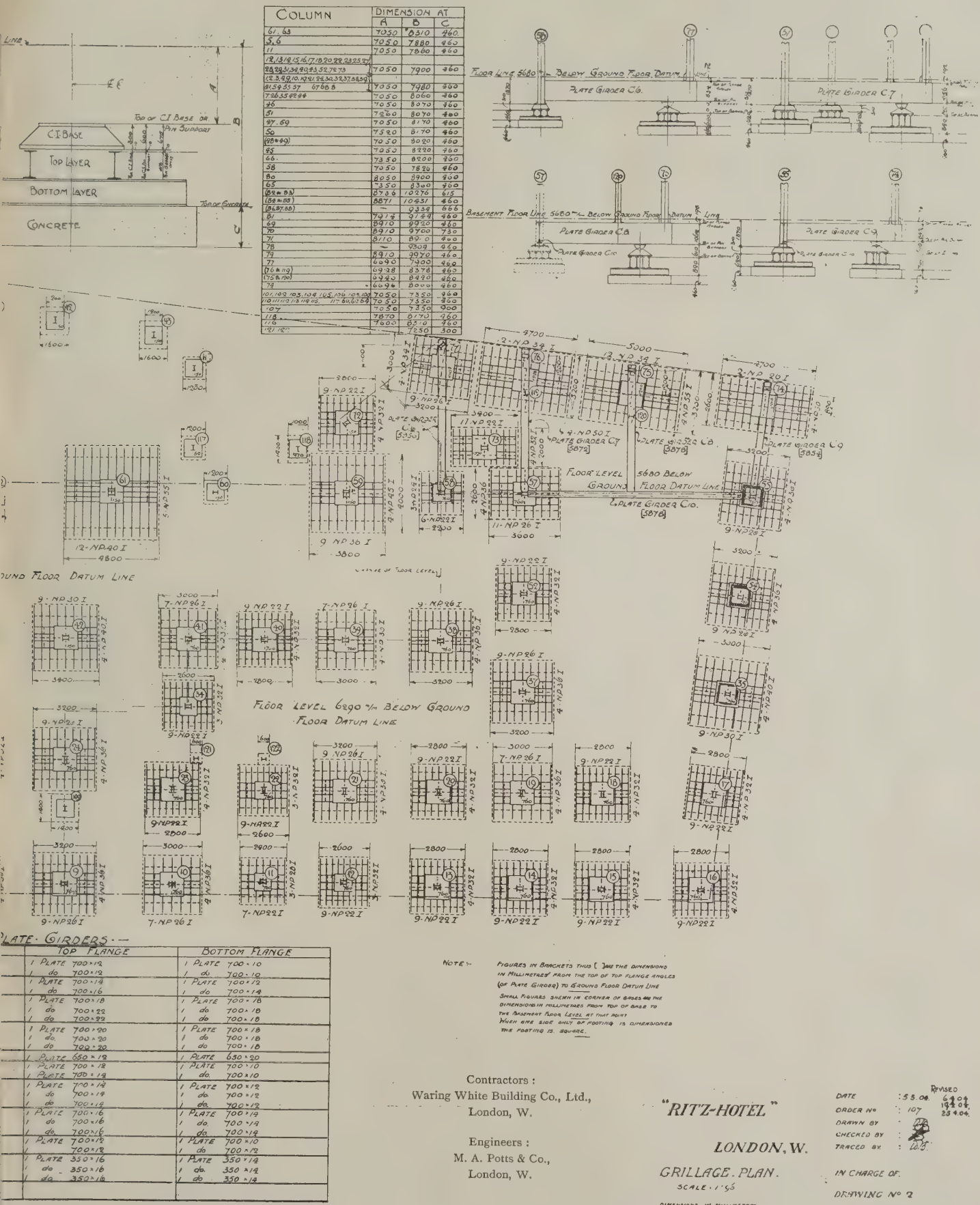
through the entire circle of 360 degs. These we shall illustrate shortly. We publish this week three illustrations which further explain what we referred to before. The site plan (see p. 238) shows the method of setting-out, and explains itself, namely, as regards the angles and lengths of the frontages, diagonals, &c. It will be seen that the dimensions are given in both millimetres and feet, the former being rendered necessary by the German steel, which forms so integral a part of the structure; and consequently all the steel-work is being erected and foundations set to the metric system. About 20,000 yds. of soil and rubbish were removed from the site. The quantity of concrete in the old raft removed by blasting (referred to in our first article) was about 2,000 yds.

The grillage plan here reproduced illustrates the separate pier foundations used instead of a raft of concrete over the entire site, as usual in English practice. The crossed joists embedded in concrete are clearly shown, with dimensions of the steel joists, while the section and table seen at the top of the drawing show the various dimensions as to depth of concrete and distance below ground-floor datum line. It should be noted that the word "column" used means a stanchion—an Americanism. The table of sections of plate girders at the bottom of the drawing refers to the cantilever foundations, a photograph of one of which is given on the preceding page. The cantilevers are shown in section on each side of the drawing. It will be noticed they are on cast-steel pins to ensure the thrust being perpendicular on the foundation; if it were not for this the slight settlement that must necessarily take place would cause the line of thrust to be inclined, so rocking the foundation and probably causing failure. The advantage of these cantilever foundations is that they avoid all underpinning and spreading under the adjoining land, the incon-

venience and expense entailed thereby, and the interference with the adjoining owner's rights perpetually occurring. In the United States it is customary at the present day not to have party walls, each building being entirely independent.

We call attention to the careful and systematic way in which every dimension is checked by the engineers and the initialled record of the individuals responsible. It is worth noting, too, that every necessary dimension is figured on the plans and nothing left to chance in the scaling off, which architects in this country very often do with the object of saving trouble, for want of knowledge, or with the mistaken notion that the drawings should look neat and pretty.

SECTIONS		
MARK	WEB	FLANGE
C1	2 PLATES 800 x 12 1 do 800 x 10	8 ANGLES 150 x 15
C2	2 PLATES 1000 x 14 1 do 1000 x 20	8 ANGLES 150 x 15
C3	2 PLATES 1000 x 14 1 do 1000 x 20	8 ANGLES 150 x 15
C4	2 PLATES 1000 x 16 1 do 1000 x 20	8 ANGLES 150 x 15
C5	2 PLATES 1000 x 12 1 do 800 x 10	4 ANGLES 150 x 15
C6	2 PLATES 800 x 12 1 do 800 x 10	4 ANGLES 150 x 15
C7	2 PLATES 1000 x 16 1 do 1000 x 20	8 ANGLES 150 x 15
C8	2 PLATES 1000 x 16 1 do 1000 x 20	8 ANGLES 150 x 15
C9	2 PLATES 800 x 14 1 do 800 x 20	5 ANGLES 150 x 15
C10	1 PLATE 990 x 10	4 ANGLES 150 x 15
C11	1 PLATE 990 x 10 1 do 690 x 12	4 ANGLES 150 x 15



Construction Notes.

Ventilation.

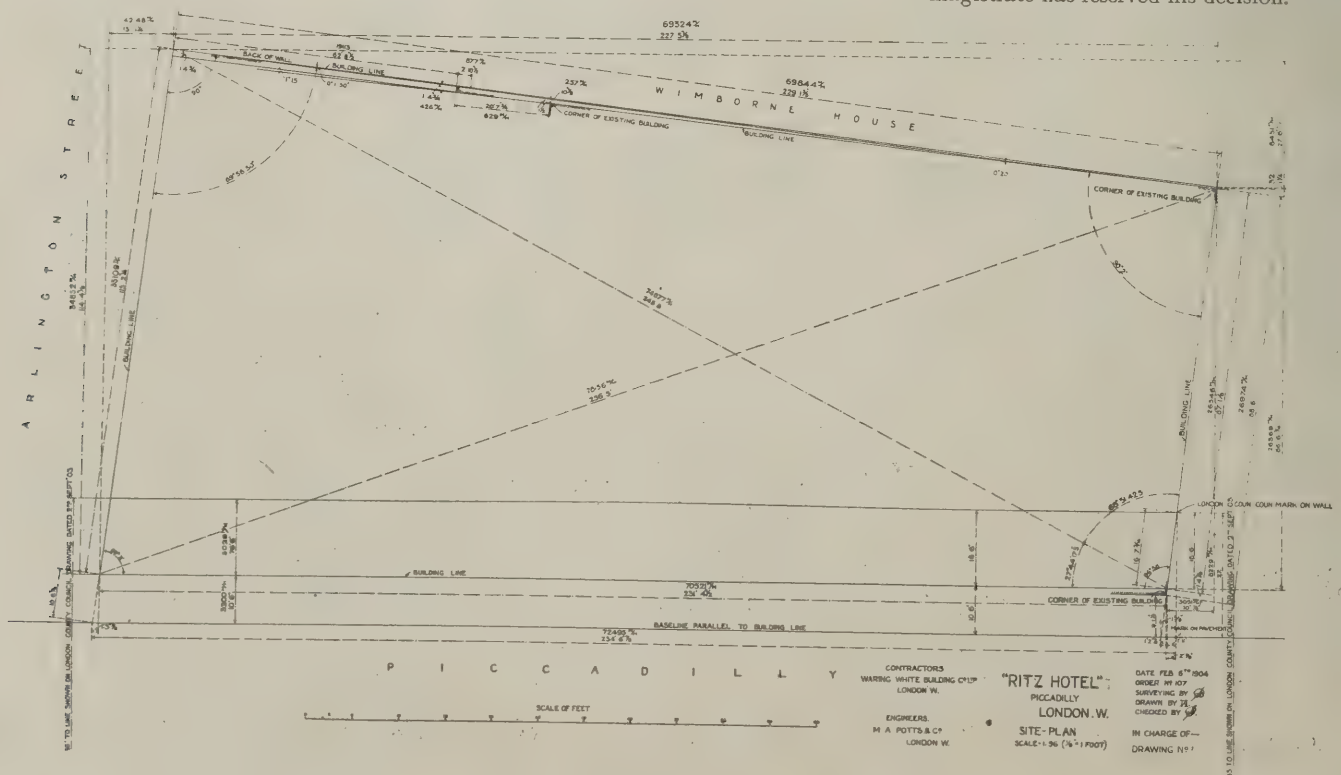
In a paper read at the autumn meeting of the Institution of Heating and Ventilating Engineers on October 18th, Mr. H. H. Grundy gave some useful notes on ventilating inlets and outlets in connection with a gravity or "natural" system. There has been a great deal of discussion on this subject, and Mr. Grundy made a number of experiments with the object of coming to some conclusion, and he declares that to obtain the most thorough distribution of air throughout the room the inlet should always discharge opposite the coldest surface. Taking a room with three inside walls and one outside, the warm-air shaft should be constructed in the inside wall opposite the exposed one. In this case the exhaust-air shaft should be formed in the same wall adjoining the warm-air shaft. In the case of a room having two outside walls, the warm-air inlet should be situated to discharge from the shaft in the inner wall along one outer wall towards the other outer wall. The exhaust-air shaft in this case should be situated in the inner wall at opposite end. In the case of a room with three exposed walls the positions of warm-air inlet and exhaust shafts should be as described for one exposed wall only. The general idea was to place the exhaust as far away as possible from the inlet, but practice had proved that this arrangement had not the same beneficial results. In a system he described, the warm air was admitted through registers fixed in all cases not less than 6ft. above the floor-line for winter ventilation, a second register being provided in the same shaft near the floor-line to admit fresh air for summer ventilation. In the same way two registers were provided in the extract-shaft, one near the ceiling and one near the floor-line. In winter time the air was admitted at the higher level, rose to the ceiling and was distributed in horizontal strata, having practically the same temperature all over the room at the same level. The exhaust register near the floor-line was opened, and by the action of the exhaust-shaft the air was drawn down, removing all the heavier gases of vitiation by this means. It followed naturally that if air was admitted at a higher temperature than the gases of respiration these must necessarily fall, and therefore the above arrangement had proved the most

successful. The advantage was further exemplified by the fact that in both cases use was made of the vertical column, and thereby constant currents were ensured. In summertime the cooler air was introduced near the floor-line, and being heavier than the respired air, assisted in its removal from the top of the room. A proper apparatus to provide humidity was needed in the warm-air generating-chamber. It had been the common practice simply to suspend a vessel of water of any size without any thought as to the quantity of air to be dealt with or the percentage of moisture requisite to render the air pleasant. In the installation under notice a vessel was provided of such a form that the exposed surface of the water could be altered by means of a regulator. As the temperature in the air-chamber varied the water-surface was altered to suit, evaporation, of course, taking place only in accordance with the surface exposed. The automatic control of the temperature throughout the building was obtained by the means of thermostats, which had been found to work satisfactorily. There only remained the question of the exhaust-air shafts, which should be arranged in the position already described. They should be of the same area as the warm-air inlet-shafts, and the registers proportioned in accordance. Still further to aid their efficiency, they should be connected by means of metal ducts in the roofs to one common shaft through which the smoke flue was carried. This induced an up-current when the apparatus was at work; or in summer time a fire could be arranged at the base so as always to maintain a temperature which would serve to keep this aspirating shaft at a sufficient heat to ensure a proper quantity of air passing through. A successful arrangement was to provide a cast-iron flue and to carry it inside a brickwork shaft of sufficient area to deal with the total area of exhaust-ducts.

The First Colony for Epileptics in England is being erected at Langho, near Blackburn. The complete scheme will cost £187,000, but a start is being made with blocks for sane epileptics, costing £78,000. Messrs. Giles, Gough & Trollope, of London, are the architects and Messrs. Robert Neill & Sons, of Manchester, the builders.

SEWAGE WORK AT BRADFORD.

DURING the past twelve months, by means of the thirty-two sludge filter presses at the Frizinghall works, Bradford, 81,285 tons of pressed cake have been made. The small experimental apparatus for the distillation of grease direct from the sludge cake has been removed, and a large plant, estimated to be capable of dealing with 18 tons of pressed cake per day, is being put down. A new Lancashire boiler, heated by means of a brick furnace, has been fixed, the fuel used being pressed sludge cake; this effects a considerable saving and disposes of a large quantity of sludge. The sludge filter works at Sandy Lane Sewage Works have been converted into filters for the purification of tank effluent water. At the Eccleshill Farm, owing to the dry weather, farming operations have this year been more than usually successful. The sewage is being purified by chemical precipitation, followed by irrigation on land. Arrangements have been made to connect the main sewer of the Greengates works with the main sewer of the Idle sewage farm. This farm now receives all the trade effluent of the Idle district. The sewage formerly reaching the Tong works has been diverted to Frizinghall by means of a connecting sewer, at a cost of £875. The mills discharging liquid refuse into the sewers of the city have been visited from time to time, and during the year thirty-four firms have entered into agreements with the Corporation with reference to trade effluents. Of these twenty-seven have agreed to pay the Corporation for the treatment of the effluents, and seven have erected their own plants. In consequence of the engineer's report as to the character and constantly increasing volume of the liquid refuse discharged into the sewers from the various laundries of the city, the committee determined to apply the provisions of the local Act of 1897 to refuse of this nature. A few proprietors of laundries agreed upon terms with the Corporation for the treatment of their refuse with the ordinary sewage of the city, but owing to the intervention of the North-Eastern Laundries and Dyers' Association, resistance was met with in other quarters. One laundry has been proceeded against, as a test case to determine the liability of laundry proprietors and the stipendiary magistrate has reserved his decision.



Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Dispute about a Contract.

GLASGOW.—X. X. write: "Kindly give your opinion with respect to a slump sum offer, the conditions of which we send. A good deal of the work has been left out of the quantities, including about 200ft. of 14in. by 6in. stone coping, the price of which is about 4s. 6d. per ft.; chimney stalk, item 21, specified at 60ft. high, which the engineer takes exclusive of the base. He admits that these items are not in the quantities, but says we are bound to do it. You will notice that a penalty clause has been inserted. This is being enforced upon other contractors, who are delaying us from completing our contract, which time should have expired on July 23rd. Our plant having been locked up here since that date, are we not entitled to some consideration?"

Omissions from Contract.—As in this case the quantities are issued by the council and evidently form an integral part of the contract, I am of opinion that so large an item as that mentioned cannot reasonably be included under the provision in the condition (clause 4) reading "any minor parts of the work . . . omitted . . . but clearly inferred . . . shall be held to be included in the contract," and I do not think that the power under clause 20 can be interpreted as empowering the engineer to require so large an addition to be made free of charge. *Height of Chimney Stalk.*—Is this not clearly shown on the drawings? If not, I consider it should be 65ft. high (clause 38) in addition to the 2ft. 6ins. foundation specified in clause 33. *Delay in Completion.*—There is little doubt the penalty clause (15) can be enforced if the cause of the delay lies with you, but if I correctly understand that the council themselves, or their other contractors (over whom you have no control), are the cause of the delay, the provisions of clause 19 (second portion) are not being complied with, and I am of opinion that you will not be held liable, upon the ground that "all reasonable facilities" are not being given, as there required. You would do well to consult your legal adviser before taking any decided action in this matter. F. S. I.

Preparing Specimens of Carpentry and Joinery.

BURSLER.—THEORIST writes: "What kind of articles are usually made and submitted as specimens of practical work to the City and Guilds of London Institute for Honours stage, carpentry and joinery?"

Suitable subjects for specimen work in carpentry and joinery may be found in almost any detail of construction or reduced model of same which can be put into a box of not more than 2 cub. ft. capacity. Such, for instance, as a piece of the stile, middle rail, panels, mouldings, &c., for a 2in. framed door, made as if cut out from a finished door and trued up to, say, 12 by 15. This may be varied by showing diminished stile, raised lower panel and glazed upper panel. Another subject might be the corner of a cased frame for double-hung sashes, complete for, say, 12ins. in each direction, at either head or foot. Also a piece of double-faced moulded skirting with backings and grounds;

or the angle of frame and part of door for a French casement showing the special mode of excluding draughts; or a small scale model of a set of raking shores, with large-scale details of the joint at the head. Portions of roofs or framed floors may be selected for the purpose of models; for example, the set of pieces meeting at the head of a queen-post, or the set of pieces with stirrup and gibs and cottars at the foot of a king-post. The pieces should be very carefully made and fitted together, but so that they can be taken apart for examination. They should not be painted or varnished but left straight from the tool. The specimens must be accompanied by a certificate that they have been wholly executed by the candidate, and by working drawings with particulars of quantity and nature of materials used. A price may be affixed if the candidate is willing to sell his specimen.

HENRY ADAMS.

Action for Negligence against Architect.

CONSTANT READER writes: "A client is suing me for damages for professional negligence. He claims that work which was carried out from my drawings and specifications and under my superintendence is not of the description as specified, and that the building is of an inferior quality. He also claims that work has been charged for and not done, and disputes my settlement of the builder's account. I send a copy of the conditions of contract which was used. What is the best course to pursue?"

As this is an important matter, closely affecting your professional reputation, we advise you to consult the best and most experienced solicitor you can without delay. The decision in the case will turn entirely on the facts placed before the court. If there has been negligence, or you have passed work not according to specification, and if work has been charged which has not been executed, you are liable and should settle the case as cheaply as you can. But it is for the plaintiff to make out his case. Unless he can prove what he complains of, you should win. In the absence of more information it is impossible to advise you further than this.

S. P. J. M.

Rubbings.

BRISTOL.—J. T. writes: "Which is the most practical way to obtain rubbings of metal-work or stone tablets, &c., and the best paper to use?"

Use heel-ball and thin lining paper; the former you can obtain at any cobbler's.

Cost of Building in South Africa.

RICHMOND.—X. writes: "What is the comparative price of buildings in Cape Town as compared with England? Is brick and tile construction suitable?"

Wages are higher out there and building more expensive, but it is impossible to state any comparative cost, as everything depends on situation and other special circumstances. In our issue for May 20th, 1903, we gave a list of current prices of building materials in South Africa; this will probably be of service to you. Brick and tile construction is quite suitable, though in Johannesburg and other growing places steelwork is being extensively employed.

R.I.B.A. Examinations.

TRANSVAAL.—SCOT writes: "(1) Which are the best books to study for the R.I.B.A. preliminary examination; also prices? (2) Has one to submit measured drawings of existing buildings, and if so, would buildings out here do—such as old Dutch churches?"

(1) A list of books recommended for the R.I.B.A. examinations is given in the "Kalendar," to be obtained from the Institute, 9, Conduit Street, London, W., price 2s. 6d. (postage extra); prices of most of

them will be found in our "Book List." (2) Old Dutch churches would form excellent subjects for measured drawings.

Fungus in Floor.

WIMBORNE MINSTER.—B. writes: "I send you some fungus taken from under a floor in the following circumstances:—A new staircase and hall was added to an old house. The new floor was laid with oak blocks and the hall panelled with oak all round. Twelve months after the work was finished, the panelling and skirting was bulging, and on the dado being removed the whole back was found to be a solid mass of fungus, which stripped off like ivy from a wall. All was taken down, coated with Carbolineum and refixed. Now the floors adjoining are attacked and the bridging joists perished and the new skirting gone. Ventilators 14ins. by 16ins. were inserted and pipes laid under the concrete floor to ensure thorough ventilation. Undoubtedly the solid block floor cuts off and prevents the ventilation being so thorough as before. The old walls are solid 14in. by 9in. brickwork without a damp-course and close to a river, but prior to the additions no damp was found, the walls were dry and no rot or fungus was ever known. Is the fungus sent the result of bad ventilation and damp? Is it dry-rot, and what would be the best cure?"

We sent the fungus—a very offensive growth resembling rotten and mouldy leather—to Prof. Bayley Balfour, of the Royal Botanic Garden, Edinburgh, and he informs us it is certainly the fungus of dry-rot, that the conditions of its growth are due to bad ventilation and damp, and that the remedy is to remove all infected wood, improve the ventilation and protect against damp.

Liability to Make Road.

NEWPORT PAGNELL.—Z. Y. Z. writes: "If land on one side of a parish road 12ft. wide, and kerbed both sides, is let for building purposes, and the road made the required width, say 36ft., according to the by-laws, is the new part a private road and must it be made by the purchaser of the land?"

The law is in a very unsatisfactory state in dealing with points such as that raised. As the district possesses by-laws, the authority can probably prevent the building owner from erecting any houses on a thoroughfare or passage less than the prescribed width; and as he must thus widen the present thoroughfare preparatory to building, he makes a new street, the cost of which falls upon him. At the same time the particulars given are not sufficient to base a definite opinion upon, as the existence of old houses upon one or both sides of the thoroughfare in question might raise the question whether the building owner could be forced to widen, or if so, whether the street was a new street.

Rag Slating.

PEMBROKESHIRE writes: "Kindly inform me how to lay 'Peggies' slates, which are from gins. to 14ins. long and of different widths. It is not safe to put less than a 4in. lap with sizes in this district. Is the lap calculated in the same way with 'Peggies'?"

The slates should be sorted for length—the longer being used at the eaves and the shorter at the ridge. The lap should never be less than 3ins., and to obtain this object the gauge may be diminished as the ridge is approached. The slates are usually laid on battens and should be secured by stout nails—2in. (90 to 100 lb.) and 1½in. (110 to 120 lb.) being the usual sizes. I have known such slates to be bedded solidly in cement. When, in such a case, the roof is boarded, ventilation to the underside of the slates should be provided by laying the horizontal battens upon vertical battens, these latter being carried on the boarding.

F. S. I.

True Definition of a "Lobby."

SUTTON.—ONE IN DOUBT writes: "What is the true meaning of a 'lobby' in an ordinary dwelling-house? Is it inside the front door or outside? In a case in point there is no vestibule door, only an ordinary front door set back 3ft. from the face of the building."

We will quote a few dictionary definitions before giving our own view as to what a lobby really is. Annandale says: "An apartment giving admission to others; an entrance-hall; a small hall or waiting-room; a small apartment taken from a hall or entry." Burns's dictionary of terms used in architecture and building construction says: "That part of a house to which entrance is obtained immediately from the street or road or principal door and from which access is had to the various apartments. It corresponds with the hall or vestibule in larger houses—the term being applied to domestic buildings of a humble or middle-class description. The staircase is almost invariably placed in the lobby at one side. Derived from the debased Latin word 'lobia,' or 'lobium,' a covered place, like an arbour." In Russell Sturgis's "Dictionary of Architecture and Building" lobby is defined as: "A small room of communication, as between the entrance doors of a house and the hall or passage within, or from a larger hall or passage to a chamber to which it serves as a kind of anteroom. It is a general term and may be applied to almost any such part of a building. Thus, if the word 'vestibule' in a Roman house be properly applied only to the recess outside the doors, the fauces or short passage within may properly be called a lobby." Our own definition of the word, in its modern application (and it agrees with the foregoing), is—a small room or place communicating by two or more doors with the street or road on one side and the hall or passage on the other. Thus, if there is a space set back from the face of the building with a door across it leading into the house, we should not call that a "lobby": neither is it a "vestibule," because, correctly, that is the same as a "lobby." There is no proper name for such a space, but "porch" would be the nearest to apply.

Work approved and condemned by Surveyors.

In the reply to this enquiry on p. 227 of our issue for last week the Public Authorities Protection Act, 1893, was inadvertently given as "Prevention Act."

Books.

KENDAL.—D. writes: "Kindly recommend (1) a book on elementary physics and chemistry suitable to study for the examination in practical sanitary science of the Sanitary Institute; (2) also a list of books suitable for the Society of Architects' examination."

(1) "Inorganic Chemistry: Theoretical and Practical," by W. Jago (price 4s. 6d. post free from our offices). (2) Write to the Secretary, Society of Architects, Staple Inn Buildings, Holborn, W.C.

TUNBRIDGE WELLS.—FRANKFORT writes: "Which are the best all-round books on (1) heating and hot water, (2) sanitary work, and (3) the best text-book on elementary practical mathematics for the Board of Education's examinations?"

(1) C. Hood & F. Dye's "Warming Buildings" (1s.); (2) T. E. Coleman's "Sanitary House Drainage" (6s.); (3) C. T. Millis's "Technical Arithmetic and Geometry" (3s. 6d.). The prices stated are post free from our offices.

Articles.

HARROGATE.—JUNIOR writes: "Is it possible for a young man to enter the architectural profession without being articled?"

It is possible, but not usual. Ordinarily

parents pay a premium for their sons to be taken into an architect's office. As the beginner is practically of no use to the architect he does not receive any salary, but when he has finished his articles he should be competent to earn his own living as an assistant. Influence is a great factor. Possibly you may know an architect who would take you without a premium, out of sympathy or relationship; but such cases are rare. This is the only way you can gain a practical working knowledge, though the Architectural Association Day School, King's College, University College and South Kensington offer facilities for excellent preparatory training.

ROMANESQUE ARCHITECTURE IN ENGLAND.

A LECTURE on this subject was delivered by Mr. C. F. Innocent before the Sheffield Society of Architects and Surveyors last Thursday. It was pointed out that there were two varieties in England—Saxon and Norman. Such energetic builders were the Normans that very few examples of Saxon architecture remained, and those were nearly all of the century immediately preceding the Norman Conquest. Within the Sheffield district there were forty-eight ancient churches which contained Norman work, but only two which contained Saxon work, viz., Laughton-en-le-Morthen and Carlton-in-Lindrick. After discussing the formative elements in English Romanesque the lecturer went on to describe Saxon architecture in detail. He then considered the question of the origin of our Norman architecture, and showed that in design the early Roman cathedrals were based on the church of St. Stephen at Caen, which William the Conqueror built as an offering for his victory at Hastings. Blythe Church, near Worksop, was an interesting example of the influence of the Caen church in the Sheffield district. Mr. Innocent next described the features of the Norman style, and traced their development. He considered that Conisbro' Castle was the finest and most interesting example of the perfect Norman style in the district. Steetley Chapel, near Worksop, was also a most perfect and beautiful example. He showed how the demands of the church authorities for a fireproof roof led to the use of stone vaults, and pointed out the various difficulties of construction which the mediæval builders had to contend with, these being successfully met by the invention of pointed arch vaulting.

Obituary.

Mr. W. Ludlam, retired builder, of Loughborough, died recently at the age of 63.

Mr. D. Bradshaw Alley, of Southport, was buried last week. He practised as an architect in Manchester for many years, being concerned in the erection of several important buildings in that city and elsewhere. Mr. Waterhouse, R.A., was a pupil of his. Deceased was ninety-three.

Mr. Frederic Smith, J.P., architect and surveyor, of Manchester and Eccles, died on October 22nd. A native of Corby, in Lincolnshire, he received most of his education at a foundation school, but at the age of thirteen obtained employment in the construction works of the Great Northern Railway, and two years later was apprenticed to a joiner at Thurlby. In 1859, at the age of twenty-three, he went to Manchester and settled down. He took great interest in the electricity, tramway and sewage departments. In 1873 the Society for Promoting Scientific Industry selected Mr. Smith as one of the artisan reporters on the Vienna Exhibition, and from time to time he was a contributor to the columns of the trade papers.

Keystones.

In Glasgow there are 8,300 empty houses.

Municipal and County Club.—The Right Hon. the Lord Mayor of Liverpool, Sir Robert Alfred Hampson, J.P., will be the guest of the Club at their house dinner on November 7th.

Standardized Rails.—The Engineering Standards Committee, 28, Victoria Street, S.W., has just issued "The British Standard Specification and Sections for Bull-Headed Railway Rails," price 10s. 6d. nett.

The Annual Conversazione of the Architectural Association was held at Tufton Street, Westminster, on Friday evening, when about six hundred members and guests were received by the president, Mr. E. Guy Dawber, and Mrs. Dawber.

Competition for Wesleyan Hall, Birkenhead.—In an open competition held recently for a new Brunswick Wesleyan Hall, Price Street, Birkenhead, the design of Messrs. T. T. Rees and Frank Rimmington was placed first, and they have received instructions to carry out the work.

The British Weights and Measures Association—to which we referred in our editorial columns recently—has issued a manifesto respecting the standardizing and simplifying of British weights and measures; and opposing the metric system for this country. The manifesto is in pamphlet form, and is issued from the offices of the Association, 25, Victoria Street, S.W.

Scotch Architects for South African Buildings.—A young Glasgow architect, Mr. John Ralston, has been selected to carry out the erection of the new town hall and municipal buildings for Pretoria. This is the second important architectural competition in South Africa where the design of a Glasgow-trained architect has been accepted; recently Mr. Thomas A. Moodie, A.R.I.B.A., was appointed architect for the very large buildings in Johannesburg to be used as the central offices of the railway system.

British School at Athens.—The annual meeting of subscribers was held last Thursday in the rooms of the Society of Antiquaries, Burlington House, the Attorney-General, Sir Robert Finlay, presiding. The report stated that the session 1903-4 had been rendered noteworthy by the erection of the Penrose Library, by the continuously successful excavations in Crete, and by the inception of the Lakonian survey. The Penrose Library would be ready for the reception of books about December.

City and Guilds of London Institute.—The annual report on the work of the department of technology shows there has been steady progress in the session 1903-4. The attendance of students in the chief classes in the building trades was as follows:—

	1903.	1904.
Carpentry and joinery	3,536	3,646
Plumbers	3,253	3,308
Painters' and decorators' work	1,058	1,239
Builders' quantities	939	1,264
Brickwork	864	781
Masonry	623	696
Plasterers' work	117	105

The percentage of failures in examinations is still very high: in carpentry and joinery 58.3. The report is published by Mr. John Murray, Albemarle Street, London.

A new Town Hall at Leigh is being erected at an estimated cost of £40,000, including £10,000 for the site. Mr. J. C. Prestwich, of Leigh, is the architect and Messrs. R. Neill & Sons, of Manchester, are the builders. The main entrance will be from Market Place. The building is in the English Renaissance style and will be of three storeys, nine shops occupying the frontage to Market Street. The council-chamber will be 41ft. by 37ft., with two committee-rooms 18ft. by 34ft. and a mayor's parlour 31ft. by 20ft. It is expected that the building will be opened in about two years' time.

£4,000 for setting back 4ft. has been paid in connection with three houses in Old Broad Street, London.

A new Calvinistic Methodist Chapel at Penmaenmawr has been erected from designs by Mr. J. S. Coverley, architect.

The Church of All Saints, Tooting Grave-ney, is being erected. Mr. Temple Moore is the architect and Mr. Sherwin the builder.

The Royal Sanitary Institute.—The King has been graciously pleased to confer the title "Royal" upon the Sanitary Institute.

Berlin's new Hospital promises to be the largest in the world. When finished next year it will contain 2,000 beds. The largest hospital at present in Germany is near Hamburg, with 1,630 beds.

For a new Theatre at Carlisle, to replace that which was burnt down in September last, Mr. W. H. Bendle, of Newcastle, has been selected to prepare designs in conjunction with Mr. Hope.

A new L.C.C. Lodging-House is to be erected at the corner of Kemble Street and Drury Lane, to be known as Kemble Street House. The building is designed to accommodate 699 men and will resemble Carrington House, Deptford. The charges are to be 7d. for lodgers who take a cubicle for one night, and 6d. a night for lodgers taking a weekly ticket. A tender of £46,100 for the erection of the house has been accepted.

Pencil Drawings of Architecture.—There is now on exhibition at the Goupil Gallery, 5, Regent Street, S.W., a collection of about 100 architectural drawings in pencil by Mr. John Fulleylove, R.I. These include a drawing of the west front of Bourges Cathedral, one of the south door of the Holy Sepulchre Church, Jerusalem, and a third of the Piazza del Duomo, Perugia—all these beautiful drawings, especially the first-named, which is superb.

The Cowen Memorial at Newcastle-on-Tyne is to be executed by Mr. John Tweed, of Chelsea—the sculptor of the Rhodes Memorial at Bulawayo.

Ipswich Hippodrome.—The foundation-stone of this building was laid last week. The site is in St. Nicholas Street. Messrs. Frank Matcham & Co. are the architects and Messrs. T. Parkington & Son, of Ipswich, the builders.

The Birmingham Architectural Association Green Book for 1904-5 has just been issued. It contains some interesting sketches by Mr. James A. Swan. Reference is made to registration and to the fact that the Association, by 64 four votes to 12, has decided in favour of it.

The Parish Church of St. Thomas-à-Becket, Portsmouth, which has been closed for two years, is to be reopened for public worship on November 8th, after repair and renovation under the direction of Mr. T. G. Jackson, R.A. One of the most interesting features is the restoration of the pulpit. Originally there was suspended over the old "three-decker" a sounding board on which stood a winged figure popularly called "The Angel Gabriel," but which is really meant for a representation of the goddess of "Fame." This, having been removed many years ago and lost sight of, is now to be replaced in its former position upon a new sounding board. This latter has been constructed out of old oak taken from the timbers of H.M.S. "Tremendous," which was present on the occasion of Lord Howe's victory on June 1st, 1794. The ornamentation on the surrounding board will be composed of wood taken from other historic ships—namely, the "Victory," "Queen Charlotte" (late "Excellent"), "Action," "Royal George" and "Chesapeake." The church restoration fund still needs the sum of £3,000 for its completion.

Kensington's Memorial to Queen Victoria—which takes the form of a granite column 22ft. gins. high, carrying a lantern—was designed by Mr. Henry L. Florence, F.R.I.B.A.

A new Underground Convenience has been built in Old Kent Road, at the corner of Marlborough Road, from the designs and under the superintendence of Mr. W. Oxtoby, M.I.C.E., borough engineer of Camberwell, by Mr. A. N. Coles, builder, of Plymouth, who is also erecting the new baths adjoining. The sanitary fittings, plumbing and drainage work have been executed by Messrs. George Jennings, Ltd.

A new Factory in Southfields, London, for "Frame Food," has been designed by Mr. Charles E. Dawson, the planning and erection having been carried out by Mr. W. T. Walker, architect, and the metalwork by the Duchess of Sutherland's Guild. The front is of glazed bricks in white, peacock blue, green and brown, studded here and there with a design of lilies. The towers at each end are also in white-glazed bricks with copper domes. Over the main entrance is a nearly life-size coloured bas-relief of a mother and child, designed, modelled and painted by Mr. Dawson. Water is supplied from an artesian well about 500ft. deep, and is stored partly underground in a tank holding 20,000 gallons, and partly in tanks in a watch-tower to the east of the building capable of holding 17,000 gallons. A noticeable feature on this watch-tower is the windmill weather-vane. The chimney shaft is another landmark by reason of its decorations. Here white-glazed bricks are relieved with bands of purple and green, while modelled decorations represent ears of wheat. The building is illuminated by electric light. The machinery is driven by electric power, generated on the premises by means of a gas-engine fed by producer-gas.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Nov. 3	Richmond, Surrey—Board-Room	Guardians	Percy Umney, Clerk, Union Chambers, Richmond, Surrey.
" 3	Hebdon Bridge—Walls, &c.	Judson & Judson, Architects, Oakworth, near Keighley.	
" 4	Horsforth, near Leeds—Factory Premises	Messrs. Mason & Hunsworth	J. Fowler, Architect, Vicar Lane, Sheffield.
" 4	Luddenden Foot, near Halifax—House	S. Wilkinson, Architect, Sowerby Bridge.	
" 4	Porthcawl—Sea Wall	Urban District Council	G. T. David, Council Offices, Porthcawl.
" 5	Bateley, Yorks—Walls	Town Council	Borough Surveyor, Branch Road, Batley.
" 5	Shiney Row, Durham—Shops, &c.	Newbottle and District Co-operative Society, Ltd.	A. Martyn, Secretary, Society's Office, Newbottle.
" 5	Stockton-on-Tees—Extension to Chancel	Urban District Council	Charles S. Errington, Victoria Bldgs., Grainger St., W. Newcastle.
" 5	Swanage—Wall	Guardians	Surveyor to Council, Town Hall, Swanage.
" 5	Gorey, Ireland—Bathrooms, &c.	Workhouse, Gorey.	
" 5	Penzance—Alterations, &c., to Two Shops	Mr. B. Downing	Henry Maddern, F.I.A.S., 13 Clarence Street, Penzance.
" 7	London, N.W.—Entrance to Swimming Bath	St. Pancras Borough Council	T. W. Aldwinckle, 20 Denman Street, London Bridge, S.E.
" 7	Newport, Mon.—Police Station	Corporation	R. H. Haynes, Borough Engineer, Town Hall, Newport.
" 7	Penzance—Renovation to Congregational Church	J. Sampson, 8 Alverton Street, Penzance.	
" 7	Douglas—Forty Houses	Thomas Donovan, Esq.	W. H. Hill & Son, 28 South Mall, Cork.
" 7	Devonport—Valve House	Corporation	Stevenson & Burstal, 38 Parliament Street, S.W.
" 8	Leigh, Lancs—Widening Bridge	Main Roads and Bridges Committee.	County Bridgemaster's Office, Preston.
" 8	Worsley, Lancs—Widening Bridge	Main Roads and Bridges Committee.	County Bridgemaster's Office, Preston.
" 8	Ardee, Ireland—Alterations at Workhouse	Guardians	Louis Turley, 17 Lawrence Street, Drogheda.
" 8	Penzance—Bathroom, &c.	W. Rogers, 13 St. Mary's Terrace Penzance.	
" 8	Bridport—New Station Building and Cottage	Directors	Engineer, Bristol Great Western Station.
" 8	Southall, Middlesex—Lodge	Urban District Council	Reginald Brown, Surveyor, Public Offices, Southall.
" 9	Hambleton, Guildford—Annexe, &c.	Guardians	E. L. Lunn, 36 High Street, Guildford.
" 9	Brighton—Fifteen Artisans' Dwellings	F. J. C. May, Town Hall, Brighton.	
" 9	Bridgend, Glam.—Lodge, &c.	Guardians	Clerk of Works, Angelton Asylum, Bridgend, Glam.
" 10	Newcastle-on-Tyne—New Schools	Governors	H. J. Criddle, Northern Assurance Buildings, 2 Collingwood Street, Newcastle.
" 10	Derby—Girls' School	Education Committee	A. Macpherson, Tenant Street, Derby.
" 10	Newton Tracey, Devon—Rebuilding Bridge	County Council	Council Offices, Castle of Exeter.
" 11	St. Anne's Head, Pembroke—Coastguard Buildings	—	Civil Engineer, H.M. Dockyard, Pembroke Dock.
" 12	Chew Magna—Cleaning and Repairing Parish Church	—	G. W. F. Bury, Chew Magna.
" 12	Camborne—Two Shops and Houses	—	Sampson Hill, Architect, Green Lanes, Redruth.
" 12	Ballinasloe, Ireland—Extension to Accumulator House	Joint Committee of Management of District Lunatic Asylum.	Office, Asylum, Ballinasloe.
" 15	Birmingham—Enlargement of School	Education Committee	A. Rowse, 115 Colmore Row, Birmingham
" 18	Urzon, near Montrose—Coastguard Buildings	—	Superintending Architect, H.M. Naval Establishment, Rosyth, Inver-keithing.
" 18	Leek—Post Office	Commissioners of H.M. Works, &c.	Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W.
" 19	Hertford—Alterations to Police Station	Joint Committee	U. A. Smith, County Surveyor's Office, Hatfield.
" 20	Newcastle-on-Tyne—Schools	Governors	H. J. Criddle, Northern Assurance Buildings, 2 Collingwood Street, Newcastle.
Dec. 5	Edinburgh—City Hall	Corporation	Public Works Office, City Chambers, Edinburgh.
" 20	Lambeth—Conversion of School into Home	Guardians	W. Thurnall, Clerk, Guardians' Offices, Brook Street, Kennington Road, S.E.
No date	Buxton—House	—	W. R. Bryden, Architect, Buxton.
"	Cape of Good Hope—Erection of University	—	Hawke & McKinlay, 35 Craven Street, Strand.

Complete List of Contracts Open.—continued.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
ENGINEERING:			
Nov. 4	Hull—Water Softener	Corporation	A. G. White, City Engineer, Town Hall, Hull.
" 4	Porthcawl, Wales—Esplanade Sea-Wall	Urban District Council	Council Offices, Porthcawl.
" 4	Aberaman—Electric Lighting	Cwmbach Co-operative Society	Society's Offices, 2 Pitt Street, Aberaman.
" 5	Buxton—Valves, &c.	Urban District Council	G. H. Hill & Sons, 3 Victoria Street, S.W.
" 7	Frinton-on-Sea, Essex—Sea-wall	Urban District Council	A. M. Bate, Surveyor, Council Offices, Frinton-on-Sea.
" 7	Limerick—Boiler	Urban District Council	Medical Superintendent, Asylum, Limerick.
" 11	Erith, Kent—Wiring	District Lunatic Asylum	George Heath, Electrical Engineer to U.D.C., Erith.
" 11	Irvine, N.B.—Timber-Piled Wharf	Education Committee	Works Manager, Ardeer Factory, Stevenson.
" 12	Swansea—Crane, &c.	Nobel's Explosives Co., Ltd.	C. A. L. Prusmann, Borough Electrical Engineer, Strand, Swansea.
" 14	Ballinasloe—Wiring	Corporation	Resident Medical Superintendent.
" 15	Burslem, Staffs—Electric Lighting Plant	District Lunatic Asylum	Ashton Bremner, Market Buildings, Burslem.
" 15	Bootle, Lancs—Bridge	Guardians	J. B. Wolfenden, Borough Engineer, Bootle, Lancs.
" 27	Dundee—Covering for Pipes	Corporation	J. Thompson, Harbour Engineer, Dundee.
" 28	Sunderland—Generators	Harbour Trustees	John F. C. Snell, M.I.C.E., Town Hall, Sunderland.
" 28	Walthamstow—Heating	Corporation	G. W. Holmes, A.M.I.C.E., Town Hall, Walthamstow.
" 29	London, N.—Laundry Machinery	Urban District Council	E. J. Lovegrove, Borough Engineer, Municipal Offices, 99 Southwood Lane, Highgate, N.
Dec. 31	London, S.E.—Electric Bells, &c.	Hornsey Town Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
IRON AND STEEL:			
Nov. 3	Bognor, Sussex—Steel Joists	Urban District Council	Oswald C. Bridges, Surveyor to Council, Bognor.
" 3	Peterborough—Pipes, &c.	Waterworks Committee	John C. Gill, A.M.I.C.E., Waterworks Engineer's Office, Peterborough.
" 4	Valletta, Malta—Pipes, &c.	Great Western Railway Co.	Crown Agents for Colonies, Whitehall Gardens, S.W.
" 8	London, W.—Girder Work	Urban District Council	Engineer, Paddington Station, London, W.
" 11	Skegness—Pipes	Urban District Council	Elliott & Brown, Burton Buildings, Parliament Street, Nottingham.
" 14	Cairo—Steel	Administration of Egyptian State Railways	Lieut.-Colonel Weston, R.E., C.M.G., Broadway Chambers, Westminster, S.W.
" 15	Tottenham—Iron Fencing	Urban District Council	W. H. Prescott, Council Offices, 712 High Road, Tottenham.
Dec. 5	London, S.E.—Steel Rails, &c.	Camberwell Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
PAINTING AND PLUMBING:			
Nov. 3	Felixstowe—Painting	Guardians	Matron, Suffolk Convalescent Home, Felixstowe.
" 9	Dublin—Painting	Finance and Estates Committee	Mr. Morris, Clerk of Works, North Dublin Union.
" 12	Warrington—Painting	Camberwell Borough Council	Thomas Longdin, Borough Engineer, Warrington.
Dec. 5	London, S.E.—White Lead, &c.		W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
ROADS AND CARTAGE:			
Nov. 3	Llandudno—Street Extension	Urban District Council	E. P. Stephenson, Engineer to Council, Town Hall, Llandudno.
" 7	Amble, Northumberland—Making-up Lanes	Urban District Council	W. Gibson, 94 Queen Street, Amble.
" 8	Southall, Middlesex—Making-up Roads	Urban District Council	R. Brown, Engineer and Surveyor, Public Offices, Southall.
" 8	Walsall—Tar-paving Repairs	Education Committee	H. H. McConnell, Architect, Education Committee, Bridge Street, Walsall.
" 14	London, S.W.—Making-up and Paving Lane	Wandsworth Borough Council	Surveyor's Office, 41 High Street, Wandsworth.
" 14	Wrexham—Metalling, &c.	Corporation	Borough Surveyor, Wrexham.
" 14	Coulsdon—Formation of New Road	Streets Committee	Vigers & Co., Frederick Road, Old Jewry, E.C.
" 17	Southend-on-Sea—Making-up Roads	Borough Council	E. J. Elford, Borough Engineer, Southend.
" 22	Middlesbrough—Street-paving Works	Rural District Council	Frank Baker, Borough Engineer, Municipal Offices, Middlesbrough.
Dec. 5	Camberwell—Flints, &c.		W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
No date	Cockermouth—Highway Repairs		J. B. Wilson, 11 Main Street, Cockermouth.
SANITARY:			
Nov. 5	Pontllytyn—Road and Drains	Urban District Council	Gustard & Waddington, Solicitors, Tredegar Chambers, Bridge Street, Newport, Mon.
" 5	Larne, Ireland—Sewers	Urban District Council	W. G. Younge, Clerk, Town Hall, Larne.
" 5	Teddington—Sewer	Urban District Council	M. Hainsworth, Surveyor, Council Offices, Teddington.
" 7	Surbiton—Drains	Urban District Council	Council Offices, Surbiton.
" 11	Skegness—Sewerage Works	Urban District Council	Elliott & Brown, Burton Buildings, Parliament Street, Nottingham.
" 15	Dover—Drains	Town Council	Henry E. Stilgoe, A.M.I.C.E., Maison Dieu House, Dover.
" 16	Hammersmith—Underground Convenience	Borough Council	H. Moir, Borough Surveyor, Town Hall, Hammersmith.
Dec. 5	Camberwell—Disinfectants	Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
TIMBER:			
Nov. 5	London, S.E.—Timber	Camberwell Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
" 17	Timber	General Omnibus Co.	Company's Coach Factory, North Road, Caledonian Road, N.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.*	DEPOSIT REQUIRED FOR CONDITIONS, &c.*	FROM WHOM PARTICULARS MAY BE OBTAINED.
Dec. 1	Wortley, Leeds—School Premises	—	—	Rev. E. Dalton, Cromer Terrace, Armley.
" 31	London, W.C.—Perspective Drawing	—	—	Sanders & Harding, 56 Lincoln's Inn Fields, W.C.
1905.				
Dec. 31	Spezia—Drainage Scheme	£400.	—	Il Signor, Sindaco della Spezia.

* Where a dash is given it does not necessarily mean that no premiums are offered and no deposit is required, but that we have not been informed what these are (if any).

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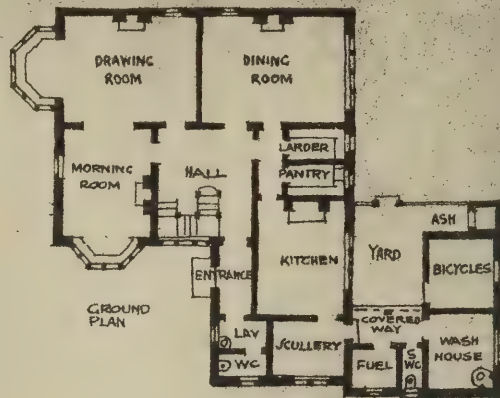
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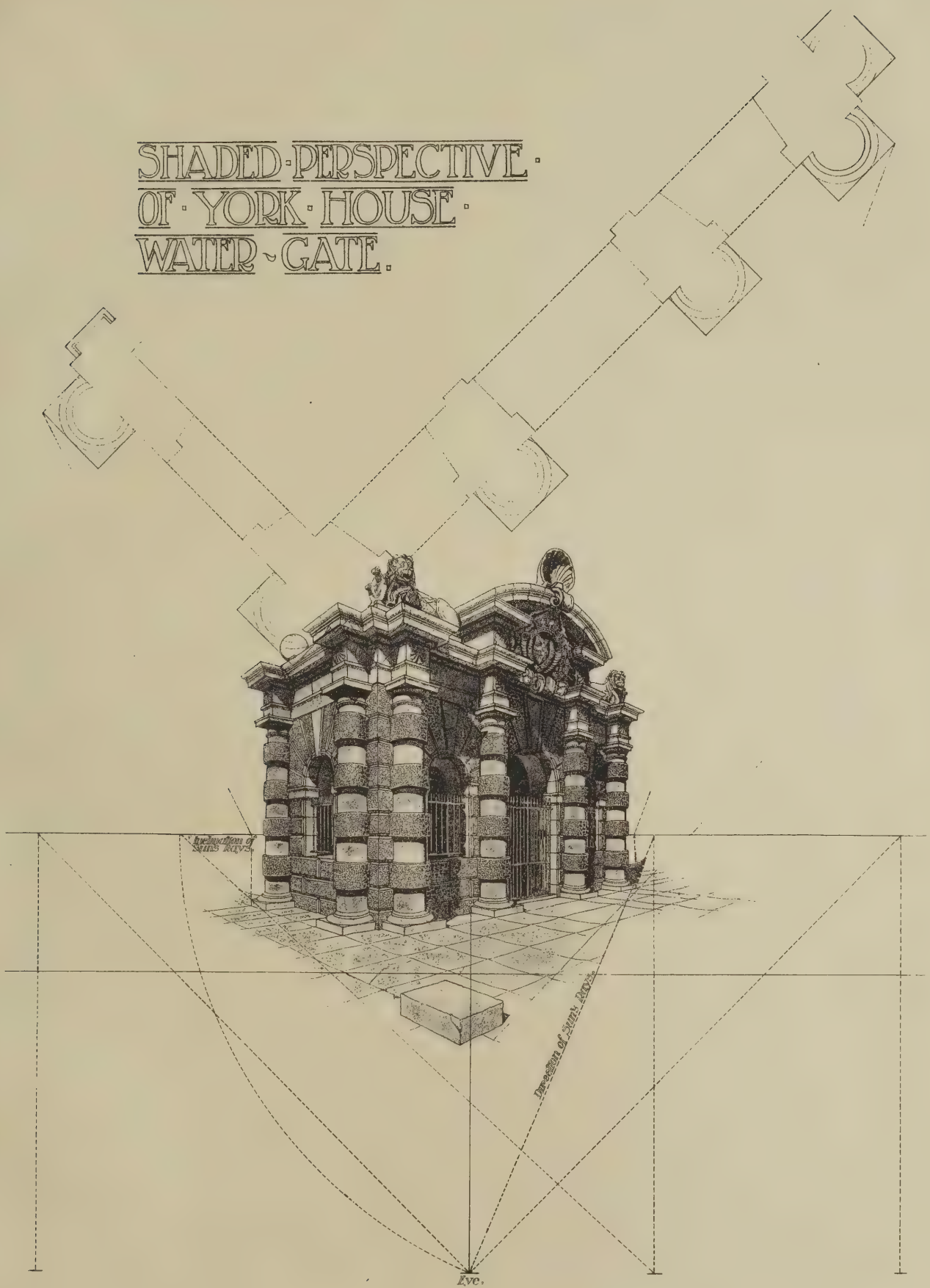
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

November 9, 1904. Vol. 20, No. 509.

6, Great New Street, Fetter Lane, E.C.

Summary.

A most elaborate scaffold, entirely filling the auditorium, has been employed by the decorators at the Coliseum now being completed in St. Martin's Lane. Marble has been extensively introduced. The dome is painted to represent a valarium. For ventilation, warmed and cleansed air will be admitted through openings all around the base of the dome and below the gallery ceiling, and the vitiated air extracted through openings under the various private boxes and in the riser between orchestra and stalls, thence to one large exhausting fan. (Page 242.)

In his presidential address to the R.I.B.A. on Monday night Mr. Belcher said nothing definite about architects' registration, deeming it discreet to keep silence till the Institute Committee had reported upon it. Speaking of Liverpool Cathedral, he said it was probably the last of the Gothic cathedrals we should see erected, and referring to the architectural treatment of buildings in the metropolis he quoted Sir A. Conan Doyle, who calculated it would take a man with the talent of Michael Angelo, the despotic power of Napoleon I. and the all-round energy of the Kaiser Wilhelm to make London what it should be—a fitting centre of the greatest empire the world had ever seen. (Page 251.)

For laying-out the roads, preparing drawings and specifications, and supervizing the construction of roads, drains, &c., on an estate, ready for building operations, the usual charge is 5 per cent. upon the outlay. (Page 246.)

A considerable improvement in the air of the City Temple has been effected by the new ventilation apparatus: 13.6 volumes of carbon dioxide per 10,000, as compared with 29.8 before the apparatus was installed. (Page 254.)

Mr. Batsford, the well-known architectural publisher, is dead. (Page 253.)

A jetty and bridge of ferro-concrete on the Hennebique system have been constructed at Purfleet for the landing of refuse brought down the river from London. The bridge was recently tested with a rolling load of 60 tons and gave satisfactory results. (Page 247.)

The annual output of the German cement firm of Alsen is about 250,000 tons. (Page 247.)

A pneumatic closet, operated by simply pressing a button, has been introduced by Messrs. Adamsez, Ltd. (Page xi.)

Specially-taken photographs on p. 253 show the exact appearance of the new Carnegie library in Henley Street, Stratford-on-Avon, in its relation to Shakespeare's birthplace and the surrounding buildings.

Protection and Repair.

WE may recall the fact that early in August the south-east pinnacle of the central tower of Bath Abbey Church was struck by lightning. Mr. T. G. Jackson, R.A., was asked to report upon the condition of the church, and he states that the damage done was less than might have been expected, but the top 15ft. of the spirelet was seriously disturbed and some of the stone shattered. There were no conductors on the building, which was obviously in danger from any storm, and it should be protected by a complete system of points and copper tapes. This calls attention to the damage which lightning may do to many of our priceless historic buildings. The public does not realize that precautionary measures should at once be taken even when conductors of a kind are fixed. The removal of the shatt red part of the pinnacle at Bath Abbey revealed, however, another defect. The whole of the four pinnacles, as well as those at the east end of the choir, were put together with iron clamps, which, being near the outside of the stone and exposed to damp, had rusted so seriously as to expand in some cases to twice their original thickness and had thereby disjoined the masonry to that extent. Mr. Jackson recommends that the whole of the four spirelets of the tower and those of the east end should be reconstructed, substituting copper rods and slate dowels for the iron clamps and ties. Copper dowels are always sought as a panacea for this sort of ill, but they are expensive, and it is very debatable whether galvanized iron is not quite as good; and even if proved not to be, copper tubes or brass dowels might be adopted, or other means. Architects who specify copper dowels need to look pretty sharp that they get them. We know of several jobs where galvanized iron was substituted by the contractors. Mr. Jackson proposes, as the pinnacles have to come down, to substitute instead of the modern bulky pinnacles some of lighter design more like those of Malvern Priory and Gloucester Cathedral, which he thinks would be a return to what was the character of the original pinnacles as shown by old prints. The north-east pinnacle of the choir is, he considers, in a dangerous state, and should be seen to without delay. The finial is broken across, and the two top courses were lifted 1½ ins. on one side. The flying buttresses were, he believes, put up for ornament, and had no work to do until Sir Gilbert Scott vaulted the nave. The vault was now overpowering the buttresses, and the walls had an inclination outwards. Two western turrets were prepared for flying buttresses to give the same architectural effect to the west front as was given by similar buttresses at the east end, and though in neither case

were they needed for strength, but only for beauty, he thinks the west front would gain very greatly if these buttresses were added. The question of the erection of the buttresses at the west end and the altering of the pinnacles has wisely been deferred. The latter may be advisable, but the former not so, because it is bad art to use sham constructive members in design. The original intention should be allowed to sink into oblivion with other mistakes of the Gothic Revival. Mr. Jackson should be able to treat the front without having recourse to these unarchitectural methods of design.

A New Language for Architects and Builders.

WE see a sandwich-man occasionally carrying a board which questions us whether we speak Esperanto. That is a language intended for all the world, being a conglomeration of English, French, German, Spanish and divers other speech. But, however desirable and convenient, we fear it will not avoid the confusion of tongues which started on the Tower of Babel. There is, however, a very great need of a new language for builders and architects, one which would satisfy the feeling of the moment while not being offensive to the most chastened ear. Such a language we here suggest, though we refrain from giving it a name. As will be seen, it is a product of local conditions; it is extremely forcible; it suggests very grievous penalty for all offenders; and it has an unlimited vocabulary. Moreover, it gains the desired effect without risking the speaker's chances in a future life. If a master-builder went on the job and found everything all wrong and behind-hand, the following polite yet forcible conversation might ensue: "Why isn't this put in as I instructed, you corbel-headed D-trap? You call yourself a foreman? Why, you ought to be stylobated, you rough-cast claw-hammered string-course. Why the curved batter don't you do as I tell you? Look at all that joinery soaking in the rain. Ugh! it makes me feel perfectly flat joint jointed." Then, just fancy a telephone conversation between the architect and the clerk of works: "He said what? Speak up Oh! Then, you hip-hooked snap-rivet, why didn't you inform me? Go and tell that stump-motised foreman that if he doesn't get the stuff as quick as sarking, he'll pugging well have to leave. What? The workmen going to strike! O! the quarry-pitched set. O! the pargetted lot of barge-boards. I'll show 'em, lamp-holed if I don't. Say, are you there? Well, why don't you say so. Now, mind you see to this, you polygonal rag-work. Because if I find you haven't when I come down I'll jolly well extrados bib-cock and random rubble your whole gang of double-quirked beads! Ring off."

THE LONDON COLISEUM.—II.

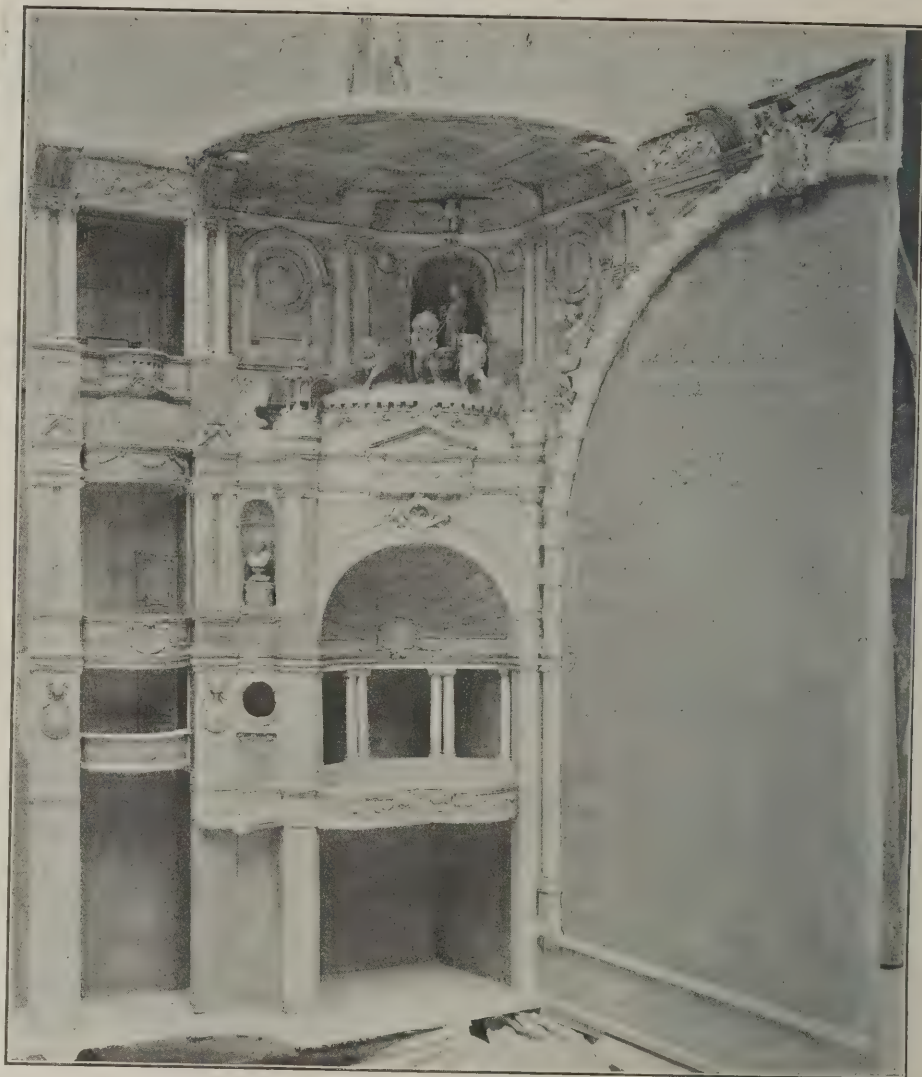
IN our issue for October 26th we published a number of photographs showing this building in the early stages of its erection, together with certain details of the exterior. We now give some photographs of the interior.

The roof of the stage is no ordinary affair. The regulations governing theatres generally are not drawn up in regard to one of this size, and they came rather awkwardly. Thus the London County Council require one-tenth of the area of the roof over the stage to open automatically in case of fire: and at the Coliseum the opening roof lights are 105ft. by 130ft. Their automatic opening is effected by a weight raised by means of a cord, the lights falling to; when the cord becomes burnt the weight drops and the lights open. This lantern light, with the proscenium wall rising in front, is shown in the view on p. 221 of our issue for October 26th.

The flies and the grid of the Coliseum are higher than in any other theatre in the United Kingdom. The grid consists of steel bridging covered with timber, acting on the principle that the stage is to be made inflammable, so as to carry the smoke and flames away from the auditorium in case of fire. The roof is covered with lead.

The proscenium opening is the largest in the Kingdom, being 55ft. wide by 40ft. high, which can be brought back to the usual 42ft. width when desired by "tormentors" or side wings. There is also a sliding proscenium border-frame by which the opening can be reduced to 40ft. by 25ft. The fireproof curtain is double-hung, with double asbestos cloth, and sprinklers above. This curtain and the other fire appliances were supplied by Messrs. Merryweather & Sons, Ltd., of Greenwich Road, London, S.E. The exactitude with which the curtain has been constructed will be apparent when we state that it is 42ft. wide with a lift of 40ft. which does not vary $\frac{1}{8}$ in. Built into the main proscenium wall are two huge stanchions, one on each side, 18ins. by 22ins., which carry the portion of the auditorium roof and the great arch over the proscenium built on the extrados of a bow-string girder 57ft. in the clear and 62ft. long, springing 12ft.; this is shown in the illustrations on p. 245.

As regards general matters, the theatre absorbed four public-houses, but it will not have a licence. Three axes or lines are worked to: a datum line, a main centre line



MODEL OF INTERIOR, SHOWING BOXES AND PROSCENIUM OPENING, BY F. DE JONG & CO.

and a curtain line. Only one slight accident occurred while the labour was engaged direct by Mr. Revell, the clerk of works. It may be mentioned that the building will contain 3 miles of carpets and 10 miles of electric casing. The time taken with the pneumatic riveters used by Messrs. Moreland averaged three seconds per rivet, 12ins. long and $1\frac{1}{2}$ ins. diameter.

The plasterwork and decoration of the auditorium has been entrusted to Messrs. F. de Jong & Co., of 84, Albert Street, Regent's Park, N.W., who have done a great deal of such work for Messrs. Frank Matcham & Co. and other theatre architects. It is all executed in what is known as fibrous plaster, commonly called in the trade "stick and rag," that is to say, there is a basis of coarse canvas and pieces of wood to form a skeleton framework, upon which the plaster is manipulated. Nearly all the work has been executed at Messrs. de Jong's shops, although necessarily there must be a considerable amount of fitting and finishing *in situ*. The view on the opposite page shows the men working on the ceiling of the grand tier: it will be noticed how the ceiling slabs are hung by stirrups from the girder.

The difficulty of executing the work complete in the shops will be readily appreciated, and it is only by the co-operation of the other trades concerned that Messrs. de Jong are able to carry it out without extensive alterations. Thus the ironwork drawings have been worked to, to a great extent, probably giving the most help of all, and of course the architects' working drawings to $\frac{1}{8}$ th scale.

The drawings prepared in the draughting and setting-out office of Messrs. de Jong have been to both $\frac{1}{16}$ in. and $\frac{1}{32}$ in. scales, with full-size details for mouldings. All the decoration is modelled in clay, and moulds cast therefrom in gelatine, which, we need hardly say, allows undercutting to be done and avoids the use of elaborate piece-moulds. In some of the larger work, however, such as the lions and chariot illustrated on this page, piece-moulds have been used. In order to



PLASTER GROUP ABOVE CHORUS BOX.

save time in the drying, these are placed in the drying-room in front of coke fires and have a very curious aspect steaming away there. The model of the interior illustrated on the opposite page was prepared at the architects' request in a plastic clay composition: this allows any details to be altered if considered necessary without having to keep the clay moist, as usual, to prevent cracks. Messrs. de Jong find these models are of very great service in realizing the scale and effect of the design; this one was especially prepared for seeing the effect of the rather peculiarly-shaped chorus box and the group above, about which a doubt existed.

The interior of the Coliseum is decorated in Classic style, the predominant colours being stone and gold. The colouring is done with oil colour, this being preferred to distemper as it does not clog the mouldings, &c. To fix all the fibrous plasterwork and do the colouring, Messrs. de Jong required an independent scaffold away from the walls, so that it could be demolished as the workmen descended. This scaffold was a remarkably elaborate one, as will be seen from the photograph below. It contained about 3,000 poles.

In addition to the numerous parts which are being carried out in fibrous plaster, a very large portion is being carried out in white and coloured marble by the well-known firm of Messrs. J. Whitehead & Sons, Ltd., of the Imperial Works, Kennington Oval, and late of Westminster, who have



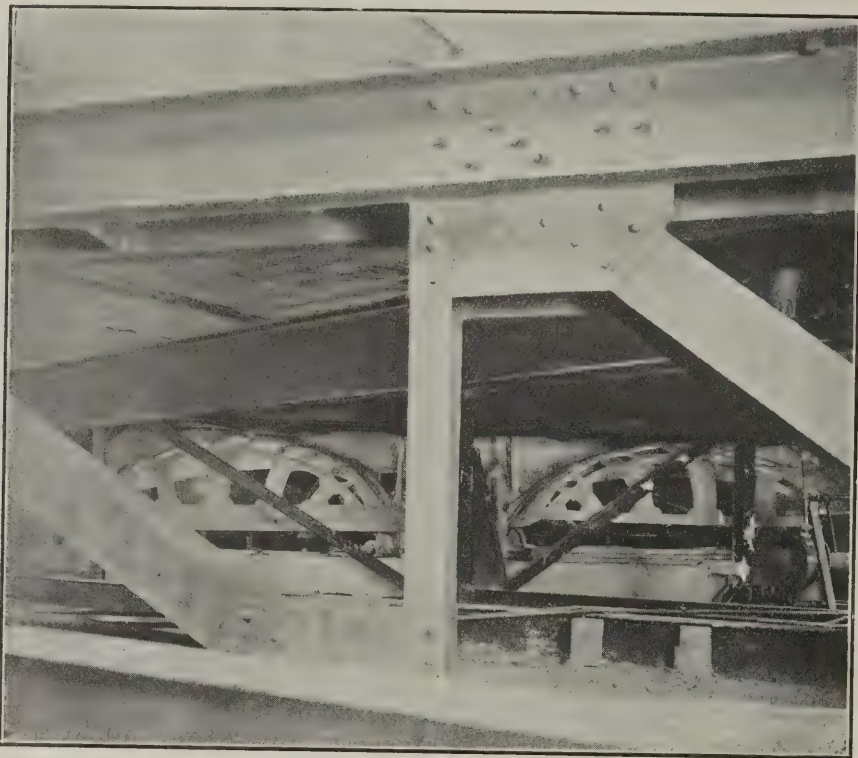
UNDERSIDE OF GRAND TIER SHOWING METHOD OF FIXING PLASTER CEILING.



THE SCAFFOLDING IN THE AUDITORIUM.

lately done so much for beautifying the interior of Westminster Cathedral. Alabaster will enrich the main piers of the auditorium which separate the boxes and reach up to the frieze of the dome ceiling. These piers, 3ft. 6ins. wide, are treated differently at the various levels, being in part rusticated and in part fluted and panelled and richly-moulded, with string-courses which will run parallel and continuous with the fibrous plaster mouldings to the fronts of the dress circle, grand tier and balcony. Each pier will have a moulded pediment at the grand-tier level and a solid double-column treatment at balcony stage, supporting the main frieze referred to above. The three solid columns are 10ft. high and of extremely fine material. The proscenium arch is worked solid in polished alabaster, the splayed piers (over 2ft. wide) being treated with richly-moulded pedestal and super-bases and other string-courses.

To the front of the stage will be an alabaster fascia, and flanking the stage on either side the entablature of the alcoved ceiling of semi-circular-shaped chorus boxes will be supported on single and double solid marble columns. Under the chorus boxes the alabaster exits from stalls will be surmounted by richly-moulded pediments, and the curved alabaster walling flanking the exits will abut against massive octagonal piers of alabaster towards the auditorium and similar canted-shaped responds against stage wall. A balustraded and moulded barrier in polished white marble will separate the stalls from the exit gangways, and will span the whole width of the building (over 72ft.). This barrier will have two exit openings leading from the stalls down to a lower level, and the marble walling towards gangways will be fitted with polished louvres for ventilating purposes. Within the barrier towards the auditorium the first of the stalls boxes on either side is to have an alabaster front with moulded string-courses, each being supported on six solid marble legs standing on an alabaster dais. The remainder of the eight stalls boxes, four on either side, have their fibrous plaster arches supported on polished alabaster columns. Behind the stalls boxes and beyond the auditorium the semi-circular foyer will have various marble columns and responds as part decoration. Similar columns and responds will also help to decorate the



VIEW FROM FAN CHAMBER, LOOKING BETWEEN DOUBLE-ROOF OF AUDITORIUM, SHOWING VENTILATION OPENINGS.

constructional supports to the ceiling of the dress circle and grand tier. The counter tops to all refreshment stalls will be in rich Paonazzo marble with moulded fronts. Around the walls of the dress circle there will be a dado in three different-coloured marbles extending to the exits, whose lobbies will also have a special marble treatment.

A very conspicuous feature will be the Royal box in a central position immediately facing the stage, and projecting slightly within the auditorium beyond the other stalls boxes, five on each side. The front of this box will be nearly 12ft. wide, and will be carried out in polished white marble with moulded balustrading, plinth and rail and panelled sides. On either side will be continuous panelled and moulded pedestals in the same material for supporting sculptured figures. Over the box will be a canopy in elaborate fibrous plasterwork, with the Royal crown as a terminal, supported on highly polished white marble columns.

The auditorium is constructed entirely in steel and concrete. The stalls occupy the whole of the auditorium floor, which has a 6ft. rake and is stepped in 12in. steppings (an unusual thing as will be seen in the view on the preceding page).

One feature which is a distinct improvement in a theatre has been adopted at the Coliseum, namely, the corridor at the back of the stalls has been sunk so as to prevent the sight of the stage being blocked. In front of the Royal box, by means of steps, all possibility of interruption of view by people standing up is avoided. Gangways lead down the side with the object also of preventing obstruction. There is a spacious orchestra.

In the front of the house are the staircases to every part of the building and the main entrance, together with crush-rooms, refreshment bars (especially noticeable being a large tea-room), press-rooms, managerial offices, &c. There are three fireproof floors in this portion, constructed on the Hennebique reinforced concrete system by Messrs. Cubitt & Co. from designs by Mr. L. G. Mouchel. Over the entrance is a large mosaic dome executed by Messrs. Diespeker, Ltd., of 57 to 60, Holborn Viaduct, London.

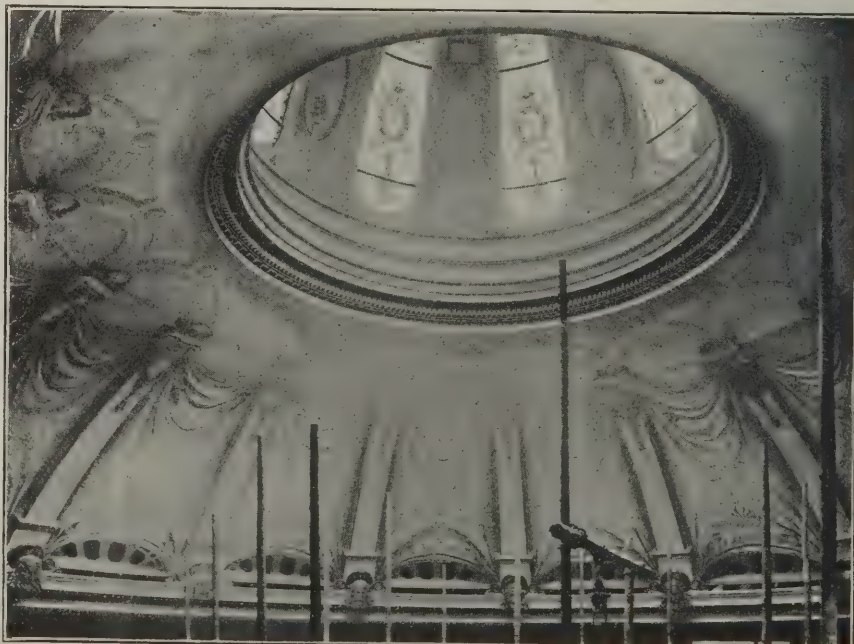
The marble work for the entrance hall, foyer, vestibule and staircase has been en-

trusted to Messrs. Anselm Odling & Sons, Ltd., of Poole Street, 132, New North Road, N. The combinations are of a varied character, and embrace Swedish, Italian and Belgian marbles of the finest quality. In the hall and staircase the walls have a skirting in Verde di Prato (a rich deep green from near Florence), with a dado filling of alternate strips or panels of Swedish green and Bianco Chiaro. The dado rail is of dark Swedish green. The surface is broken up at intervals by pilasters and architraves to doors of Breccia Serravezza. The treads and risers of the staircase are of the finest Sicilian marble, the balusters of English alabaster, and the handrail of Verde di Prato, terminating in carved newels representing griffins, dolphins, &c. The staircase columns are of Swedish green. The vestibule has the skirting and dado rail in Rouge Griotte, the dado filling in brown Brocatello, with alternate courses of brown Brocatello and Bianco

Chiaro above the dado: the whole surrounded by a heavy cornice in Bianco Chiaro. Part of this work was executed in Messrs. Odling's studios at Carrara and part in their London workshops.

The inside of the dome over the auditorium has been decorated as a valarium - the covering of light material suspended over the theatre in Greek and Roman days to give shade from the sun and make it possible for the spectators to hear the actors.

The engineering work in connection with the warming and ventilation and hot-water domestic service has been carried out by Messrs. Ashwell & Nesbit, Ltd. It is divided into two sections, the first consisting of a complete plenum system for the auditorium, and the second the warming of the stage, artists' rooms, offices, &c., which are supplied with direct heating service. Steam for the heating is generated in one Lancashire boiler 24ft. long by 7ft. diameter, fixed in the basement. Two large heating batteries are fixed in prepared chambers in the roof (shown on either side of the proscenium wall in the photograph on p. 221 of our issue for October 26th), through which are passed 3,500,000 cub. ft. of air per hour by large pressure-fans driven by electric motors of 200 volts, 8-b.h.p. and 1,000 speed, made by Messrs. Newtons, Ltd., of Taunton. The incoming air is cleansed by being passed through filtering screens, and will be warmed in the winter by being drawn over the steam batteries, after which it is forced along horizontal ducts formed in the roof space (see illustration above), and a quantity of fresh air then discharged into the auditorium at the ceiling level (see illustration below), the remainder being carried down in vertical flues and discharged immediately below the ceiling of each gallery. It will be noticed that the auditorium ceiling is a double concrete one, the air being forced in between. The vitiated air is extracted through openings arranged under the various private boxes and in the riser between the orchestra and the stalls, thence through ducts formed in the basement to one large exhausting fan driven by an electric motor which delivers vitiated air vertically into an area, finally discharging into the atmosphere at a high level. The stage is warmed by four wrought-iron pipe-coils specially designed to occupy a minimum amount of space, and all other parts of the building are warmed by direct heating-radiators of a neat pattern. Owing to the large number of people who will be congregated in this building every day for an



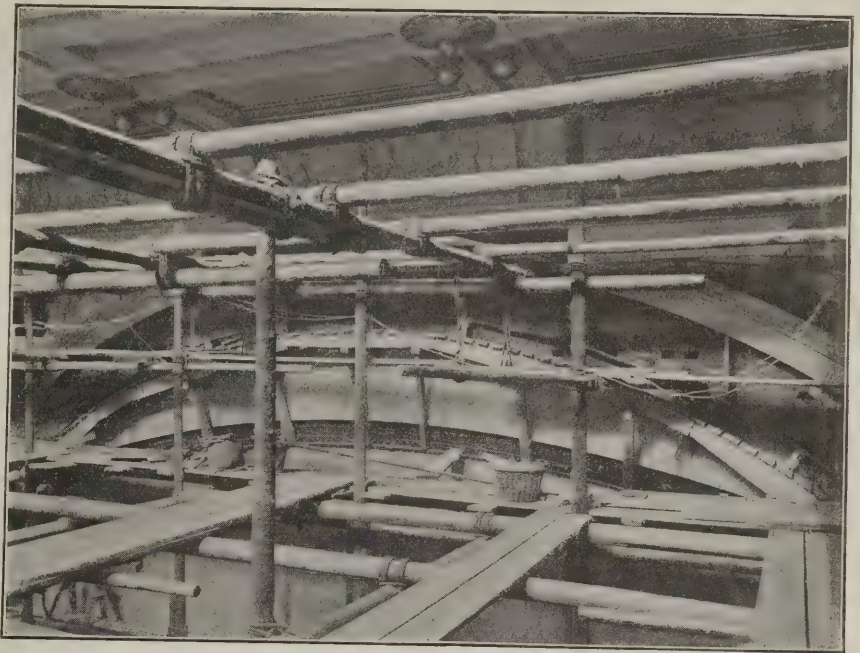
INTERIOR OF DOME OVER AUDITORIUM.

extended length of time, it has been most necessary to arrange that the ventilation shall be adequate; and in spite of the controversies which have lately taken place on this subject, there is no possible doubt that the only way to keep the air in this building sweet and fresh is to arrange for a large supply of it to be mechanically brought in and removed when vitiated.

The illustration on the next page shows the steel framework constructed by Messrs W. Jones & Son, Ltd., of Magnet Wharf, Bow Bridge, Stratford, E., to support the summit and revolving globe on top of the tower, which, in all, will be 145ft. high. This has been encased in terra-cotta by the Hathern Station Brick and Terra-Cotta Co., Ltd., Loughborough, to whom we briefly referred in the first article, when illustrations of some of the terra-cotta figures on the tower were given.

The terra-cotta work has been carefully set out by the firm's staff of experienced draughtsmen. Key drawings made to rin. scale were supplied to the contractors for erecting, showing the exact position of each piece in the building, and identifying numbers were stamped into each block before burning to correspond with the numbers shown on the key drawing. Owing to the small space available on the job for stacking, the work was all carefully assembled after coming from the kilns and despatched in proper order for erection.

Ulster Society of Architects.—A deputation from this Society waited last week on the Belfast Borough Council, urging that an architect be employed for the buildings about to be undertaken by the Tramways Committee. The Lord Mayor said that many of these buildings would be put under the care of independent architects.



ARCH OVER PROSCENIUM OPENING.

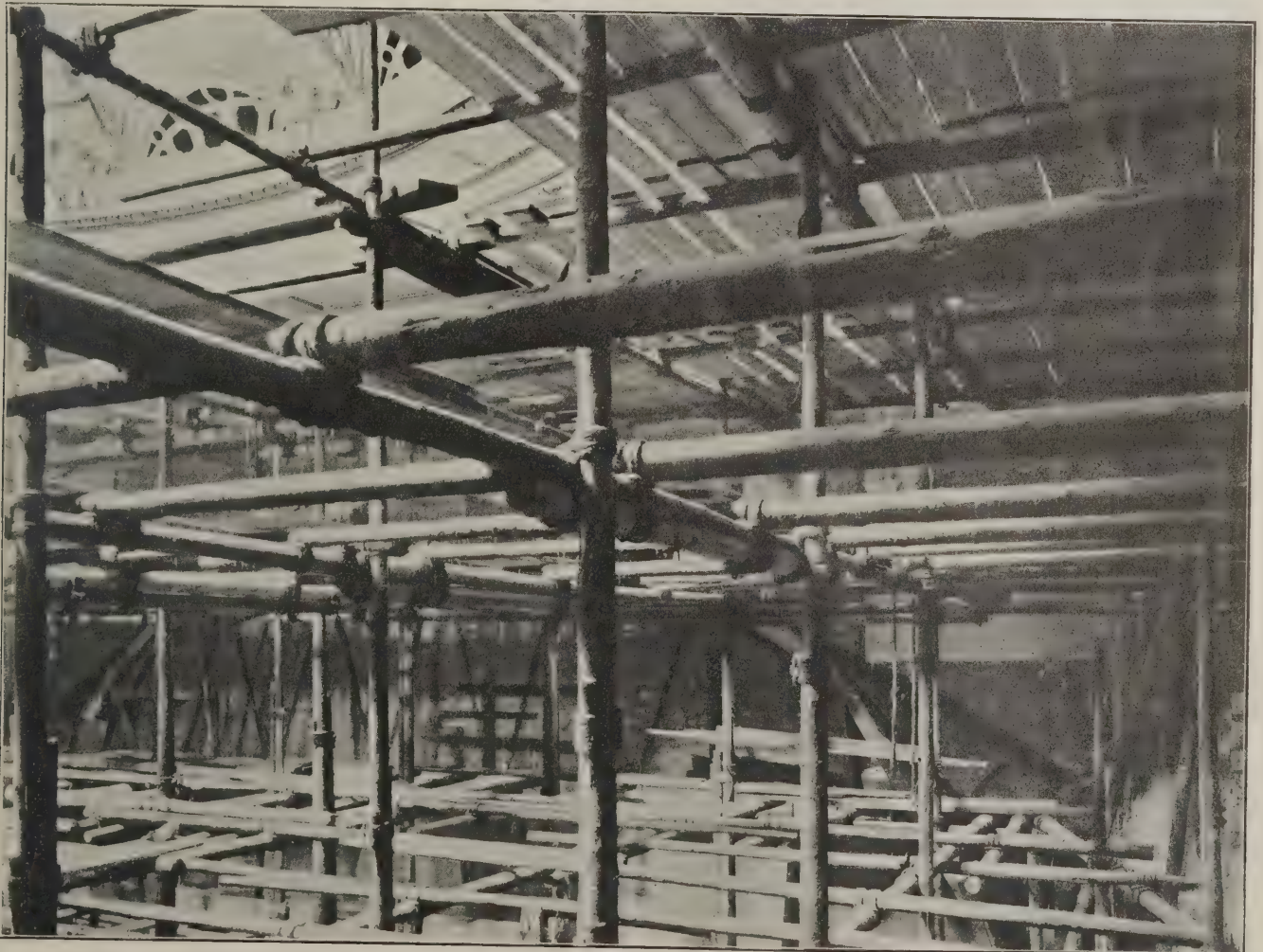
Enquiries Answered.

Swimming Bath in Basement of Building.

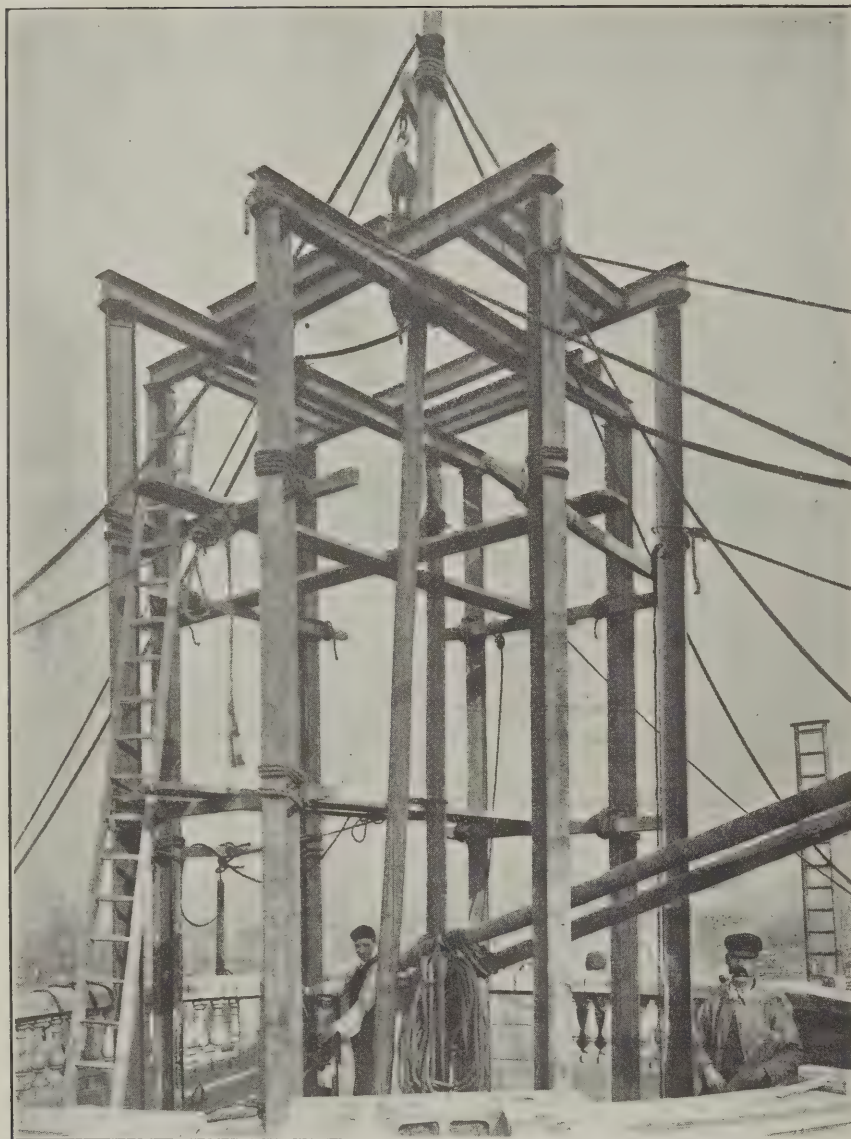
GLAMORGAN.—E. writes: "It is intended to put a swimming bath in the basement of a building. The floor of the room is 1ft. roins. below the level of the lane adjoining, and the bottom of the footings of the wall is 1ft. below the level of the basement floor. Height of wall, about 45ft. to square and about 60ft. to gable end, stone 2ft. thick,

bath 25ft. by 30ft. In keeping the excavation 6ft. from the wall next the lane, and then excavating to necessary depth for the bath, and making a concrete wall between bath and footings, would there be any danger of the lane wall being undermined, or would the thrust throw over the concrete wall?"

You neglect to state the depth to which you propose to excavate for the bath, but I presume it will not be to a greater depth than 6ft. or 7ft. below the level of the lane.



THE LONDON COLISEUM: VIEW SHOWING BOWSPRING GIRDER AND BRICK ARCH OVER PROSCENIUM OPENING.



THE LONDON COLISEUM: STEEL FRAMEWORK || SUMMIT OF TOWER.

You also omit to state the nature of the foundation upon which the building stands—this latter is a very important factor in the case, as of course if the soil be of an unstable character the risk of your proposed operation is very great. Assuming, however, that the soil of the foundation is sound, that the wall has proper footings, and that it is plumb and well built, there should be no danger whatever in constructing the swimming bath, as you propose, with a cement-concrete wall, retaining the base of the outer wall of the building. Of course, the higher you keep the floor of the basement the more stable the building will be.

F. S. I.

Dry-rot in Roof Boarding.

R. writes: "A roof having a pitch of 37 degs. is proposed to be finished underneath with oiled oak boarding, the outside covered with $\frac{3}{4}$ in. deal boarding, then 2-ply Willesden paper, and tiles hung and nailed. What is your opinion of such construction? A case of dry-rot has come under my notice (in this case tiles bedded, and no paper or felt), and I have heard of others in which roof boarding under felt or paper and good tiling has developed dry-rot."

The great and essential point in the preservation of all timberwork is ventilation, and in this respect there is no doubt that, to some extent at least, the use of felt is of doubtful value. I have myself a roof which is badly affected by dry-rot for no other reason (I believe) than the fact that it was

sheathed with felt when built (in 1860). Personally I prefer in first-class roofing to lay boards upon the rafters— $\frac{7}{8}$ in. or rim. rough—and then to place slate (or tile) battens, in the usual way, upon the boards. This arrangement forms an air cavity between the slating (or tiling) and the boarding, and, in my opinion, is more likely to prove of lasting character than can be the case where felt or other air-tight substance is employed.

F. S. I.

Fees for Laying-out Estate.

BIRMINGHAM.—E. P. writes: "What are the usual fees for laying-out an estate, superintending road and sewerage works, and setting out plots for houses as they are sold?"

For laying-out the roads, preparing drawings and specifications, and supervising the construction of roads, drains, &c., ready for building operations, the usual charge is 5 per cent. upon the outlay, though in cases where the work is extensive a lower rate would be properly chargeable. For setting-out building plots and negotiating the sales the fees would probably be settled by arrangement. A usual scale is somewhat as follows:—On first £100 of purchase money, 5 per cent.; on balance up to £5,000, $2\frac{1}{2}$ per cent.; on balance £5,000 to £10,000, $1\frac{1}{2}$ per cent.; on residue, 1 per cent. You will find a detailed scale of fees in "Specification" No. 6, p. 13, and may also refer to the information given in Whittaker's Almanac. F. S. I.

Acceptance of Lowest Tender.

AJAX writes: "Five builders, A, B, C, D and E, were invited by private letter through the architect to tender for work. The tenders of D and E were the lowest, and exactly alike. There was a clause in the form of tender that the owner did not bind himself to accept the lowest or any tender. He has now accepted D's. E contends that an injustice has been done to him. Is he entitled to compensation? Has he any legal claim?"

The circumstances you mention are rather unusual, but you have of course no legal right to compensation, as the owner was empowered by the conditions to accept any one of the tenders—even the highest if he so chose.

F. S. I.

Valuation of Property.

ASH.—L. M. G. writes: "In 'Specification' No. 4, p. 68, the following note appears: 'The value of residential property mainly depends on its advantages as a country residence, the suitability as a dwelling, and arrangement and extent of the pleasure grounds, &c.' If a London surveyor were engaged to value a provincial residence, how would he proceed: how, in fact, could he make himself conversant with the real value when he would probably know nothing of local conditions? Please also explain the application of the valuation table given on the same p. 68. It is a blank to a student without a simple example: the example given is not clear to an absolute beginner."

If a London surveyor had to value some property in the provinces he would go to the corporation office and find out what was the gross assessment of the house: then use his own judgment. He would of course have to visit the place, or get someone else to do so for him. The table in "Specification" is quite clear, and the example given illustrates its application as well as can be. Taking the nett annual value at £65 a year and a term of 40 years, the table shows that at 6 per cent. the property is worth 15'05 years' purchase: $15'05 \times 65 = £978\ 5s$.

New Drains: Liability of Owner and Lessee.

RUHTRA writes: "A certain lease contains the following: 'And will during the said term so far as is now or shall from time to time become necessary do at their own cost all such works as are or shall be requisite in order to put and maintain the said premises both externally and internally in good tenable repair and condition damages by fire excepted and in such repair and condition will at the end of the said term deliver up the same unto the lessors their executors administrators or assigns damage by fire excepted as aforesaid.' In addition, the lessee covenants to 'pay all rates, impositions and outgoings.' The local authority served notice to re-drain. When this is done I understand that as a rule the owner, not the lessee, is liable for the new drain (vide article in THE BUILDERS' JOURNAL for March 27th, 1901), the lessee under ordinary repairing clauses only being bound to repair (so long as repairs are possible) and not to renew the drain. Does the expression 'all impositions and outgoings' affect this in any way; does it transfer the liability from the owner to the lessee? Has there been any law case where it was decided that the owner was liable for a new drain when the lease was a repairing one?"

The term for which the lease is granted should have been stated. Assuming it is for not fewer than three years, in my opinion, having regard to the lessee's covenant to pay all "impositions and outgoings," the lessee is liable (see *Stockdale v. Ascherberg*). If the tenancy is from year to year, in my opinion the owner would be liable. (See *Valpy v. St. Leonard's Wharf Co.* and *Harris v. Hickman*.)

W. J. JENNINGS.



PURFLEET PIER. (Constructed of Ferro-concrete on the Hennebique system.) L. G. MOUCHEL, ENGINEER. P. W. AND C. S. MEIK, CONSULTING ENGINEERS.

A FERRO-CONCRETE BOWSTRING GIRDER BRIDGE.

AT the invitation of Mr. L. G. Mouchel, a number of engineers journeyed down to Purfleet, in Essex, on October 24th to witness the testing of a ferro-concrete bridge erected on the Hennebique system. The bridge forms part of a new jetty erected in the Thames for the landing of refuse brought down the river from London. The circular sweep of the pier, which is constructed wholly of ferro-concrete, was dictated by the necessary curve required for the railway lines, trucks being shunted direct on to the jetty. By reason of this connection with the railway it was necessary to keep the pier fairly low, and it was one of the conditions that barges should be able to pass at all tides under the pier to the inner side of the jetty. This necessitated the erection of the bridge to give sufficient span at this point, and also limited the depth of its floor to give proper headroom. The bridge is on the skew, as shown, and has a span of 59ft. 8ins., or 35ft. on the square, and a width of 26ft. 6ins. to centre of main girders. It is supported on four concrete piles 5ft. in diameter. The main girders, 6ft. deep at the centre, are constructed with eight steel bars in the top member, and eight in the bottom, placed in two rows of four bars each. In the top member the upper four bars are 63ft. long, the lower four 62ft. long. In the bottom member the bars are all 63ft. long and extend past the bridge into the piles. All

these main bars are of 1 $\frac{1}{2}$ ins. diameter. The details of the bridge are clearly shown by the drawing on the next page. The total depth of the bridge floor is 13ins.; the cross girders are 10ins. deep, and the other girders 8ins. As interesting features of the design it may be noted that no allowance has been made for expansion, it being all taken up laterally, and there is no slip between the reinforcement and the concrete. The tension bars in the main girders are shown overlapping; no special merit is attached to the double thicknesses of metal, but the overlapping affords a stronger and more convenient method of joining the bars in the top and bottom members. Particular importance is attached to the diagonal reinforcement shown in the tension members of the main girders. These exert a special influence against the distortion or crushing of the open panels of the girders; while these remain intact the bridge cannot fail. This diagonal reinforcement corresponds to the lacing in a similar type of steel girder. The arrangement of the beam ends is also of special interest. The concrete was composed of fine pit ballast and Portland cement, 4 to 1, very carefully made. The reinforcement amounts to 15 tons of steel in a total weight of 90 tons.

At the luncheon which preceded the test, Mr. Mouchel read a telegram from the consulting engineers for the pier, Messrs. P. W. & C. S. Meik, regretting their inability to be present. The test was a moving one, consisting of four four-wheeled trollies,

loaded with 24ft. steel rails to a total weight of 60 tons; the load being divided into two equal parts. The axles of each truck were 4ft. apart, and the distance between the axles of each system was 8ft. This load was drawn over the structure, and the deflection noted in five places by instruments placed under the bridge, the measurements being in millimetres, owing to the instruments being of French make. The results are shown in the table on the general plan on p. 250. The deflection of the central beams has been corrected by deducting from their actual deflection that of the bowstring girders which support them. The maximum deflection was $\frac{3}{32}$ of an inch, the bridge returning to its normal position after being released from the load. Some little difficulty was experienced in getting the readings, owing to the swaying of the temporary staging under the bridge by a strong outward tide, so that the test was repeated to ensure accuracy. It should be mentioned that the shuffling had been struck six weeks prior to the test. The results obtained must be considered highly satisfactory for this class of construction.

Builders' Notes.

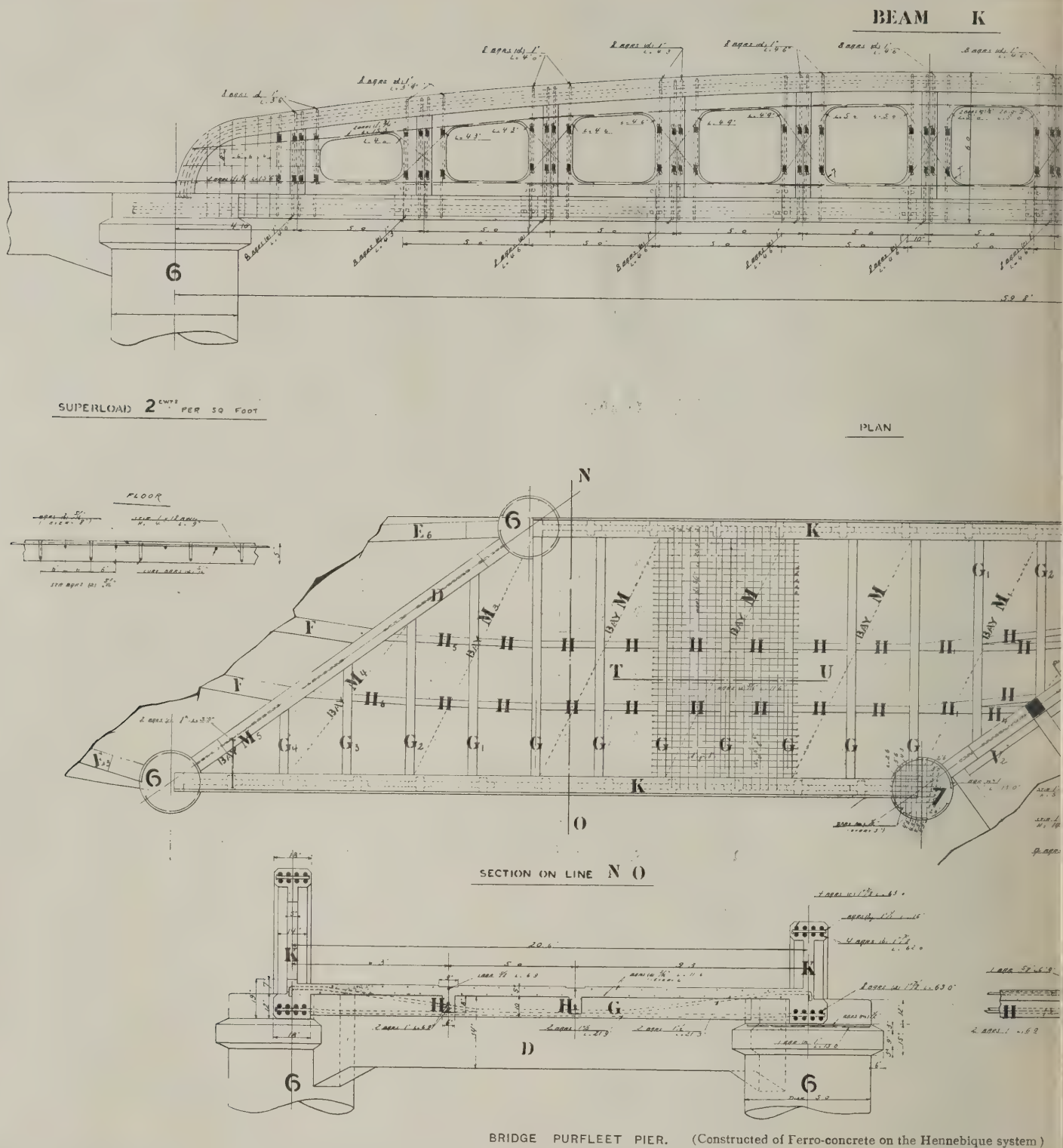
Gloucester and District Master-Builders' Association.—Mr. G. O. Estcourt has been elected president for 1904-5 and Mr. W. T. Nicholls vice-president.

Dissolution of Partnership.—The partnership between Mr. J. R. C. May and Mr. P. G. Creed, carrying on business as builders, contractors and shopfitters at Seven Kings, Essex, under the style of Curtis & Co., has been dissolved by mutual consent as and from September 26th last. All debts will be received and paid by Mr. May.

German Cement.—The German firm of Alsen employ daily about 3,000 workmen at their Etzeboe and Lagersdorf cement works, about fifty miles from Hamburg. The output averages 1,500,000 barrels annually, equal to about 250,000 tons of cement. Coal from Newcastle is used at the works, 100,000 tons per year, the freight on which alone comes to £52,500.

Scottish Building Trades' Federation.—At the recent annual meeting held at Aberdeen, Mr. William Macdonald, builder, Inverness, was appointed president for the next year, and Mr. Patrick Knox, Edinburgh, vice-president. The next meeting of the Federation will be held at Inverness.

Tender for Outfall Sewer at Plumstead.—At their meeting last week the London County Council accepted the tender of the Westminster Construction Co., amounting to £81,285, in preference to the lowest tender of £68,377, for a portion of the new southern outfall sewer at Plumstead. The matter was brought up three weeks ago and referred back (see p. 220 of our issue for October 26th).



Keystones.

The Orient Theatre is to be built at the corner of Commercial Road and Myrdle Street, E.

Architect for Newport.—Over 200 applications have been received for the position of architect to the Newport (Mon.) Corporation at a salary of £250 per annum.

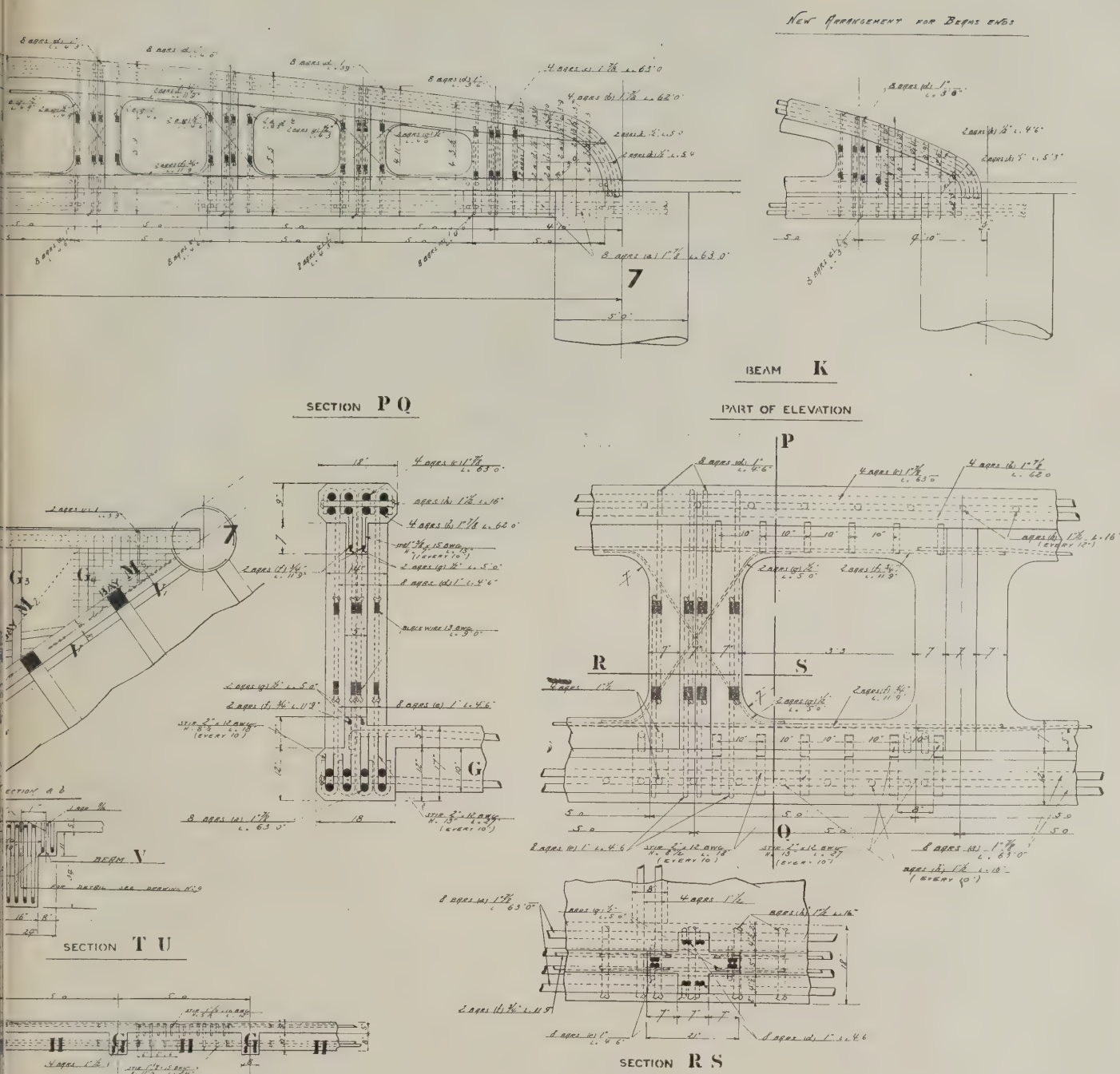
A new Radiator for Warming Motor Houses.—At the Hon. C. S. Rolls's house in Knightsbridge a new kind of radiator for motor houses has been supplied by the United States Heating Co. A small tubular boiler heated by gas or oil is placed outside the house, and connects with the radiators inside. The heater, which costs 4½d. for fuel every twenty-four hours, is equally suitable for dwelling-houses and public buildings, an installation having been tried with satisfactory results in St. Paul's Cathedral.

Repairs to the Roof of the South Aisle of Winchester Cathedral have been carried out by removing, recasting and relaying the lead. This is part of a large scheme some portion of which was carried out a year or two ago, while the eastern and other parts will probably be taken in hand shortly. Some of the lead removed and re-cast bore the date 1738, which is believed to be the date when the roof of the south aisle was last repaired.

Rifle-shooting in the Winter Evenings.—For the last three years the council of the Society of Miniature Rifle Clubs has been promoting the class of rifle-shooting termed "miniature," knowing its great utility and the very small cost at which proficiency can be gained, as compared with rifle-shooting as previously inculcated. Anyone wishing to obtain information about it should apply to the secretary of the Society, 20, Bucklersbury, Queen Victoria Street, E.C.

Examination for Sanitary Inspectors next January.—An examination qualifying for appointment as sanitary inspector or inspector of nuisances under the Public Health (London) Act, 1891, will be held in London on Tuesday, January 7th, and the four following days. Particulars can be obtained from the hon. secretary of the Sanitary Inspectors' Examination Board, 1, Adelaide Buildings, London Bridge.

A Valuation.—Mr. James Green, of Messrs. Weatherall & Green, auctioneers and surveyors, London, W.C., who was appointed by the Local Government Board to make the initial valuation of the property at the junction of Hampstead Road and Tottenham Court Road with Euston Road, scheduled by the London County Council and alleged to be benefited by them, has published his award and duly lodged it with the Council, pursuant to Act of Parliament.



L. G. MOUCHEL, ENGINEER. P. W. AND C. S. MEIK, CONSULTING ENGINEERS.

Coldharbour Church has been reopened after improvements. These include new fittings for the chancel, new reredos, organ case, organ-chamber and organ, new east window, nave roof, pulpit and heating apparatus. The whole of the work has been carried out under the direction of Mr. W. D. Caroe.

Richard Cobden's House, No. 23, Suffolk Street, London, W., is to be commemorated by a tablet of the London County Council, while the Duke of Bedford has fixed tablets on the following houses—No. 65, Russell Square (Sir Thomas Lawrence); No. 11, Bedford Street (Henry Cavendish); No. 6, Bloomsbury Square (D'Israeli); Nos. 28 and 29, Bloomsbury Square (Earl of Mansfield); No. 43, King Street, Covent Garden (Admiral the Earl of Orford); and No. 27, Southampton Street, Covent Garden (David Garrick).

Lombard Street was originally called Langbourn Street, from the stream of that name. Some people have thought that Langbourn became corrupted to Lombard, and the street retained its original name for some time after the Longsards, or Longbeards, settled in that quarter as wool dealers and financial agents of the Pope and the merchants and bankers of Florence and Lucca.

The Restoration of St. Giles's Church, Cripplegate, has been completed. The four shoppes and the old quest-house have been removed, and the hitherto blocked-in north aisle is now to be seen in all its beauty. Also, the turret has been restored, and the closed-in windows of the north aisle have been opened up and filled with stained glass. Under a canopied niche to the north doorway a statue of St. Giles with the hind has been placed.

Northope Church, Lincs, has been reopened after restoration under the direction of Mr. Hodgson-Fowler.

A Collection of Drawings and Etchings by Mr. Axel Haig, R.E., is now on exhibition at the Fine Art Society's rooms, 148, New Bond Street, W. Everyone interested in architectural drawings should see these. If we singled out any of special merit we should perhaps say that the etching of Chartres (157) is the best, though it is difficult to choose between this and Segovia (184), the two bridges, Cuenca (180), and Assisi (170). There is a delightful drawing of a Moorish archway at Toledo (153), and another of Cairo (205). The pencil sketches are not very interesting—the sketch of a street in Seville (132) is the best.

Memorial to Sir Joshua Reynolds.—After so many years a memorial to Sir Joshua Reynolds has been erected in the church

of his birthplace at Plympton. Mr. Hine, F.R.I.B.A., of Plymouth, prepared the design and Mr. J. Derwent Wood, the well-known sculptor, carved the medallion head.

The R.I.B.A. Kalendar for 1904-5 has just been issued, price 2s. 6d.

The Kalendar of the Manchester Society of Architects for 1904-5 has been issued, price 3d.

Edinburgh Architectural Association.—The statement of accounts for the past year shows a balance of £64 in hand.

The City and Guilds of London Institute proposes to make considerable extensions to its technical college at Leonard Street, City Road, involving an expenditure of about £14,000.

Glasgow School of Architecture.—The curriculum in the joint diploma granted by the Glasgow and West of Scotland Technical College and the Glasgow School of Art is given in the syllabus for the session 1904-5, just issued.

Leeds and Yorkshire Architectural Society.—The annual general meeting was held on Thursday evening, Mr. G. B. Bulmer presiding. It was announced that the Society had a total membership of 155. There is a small balance in hand. The presidential address will be delivered on November 17th.

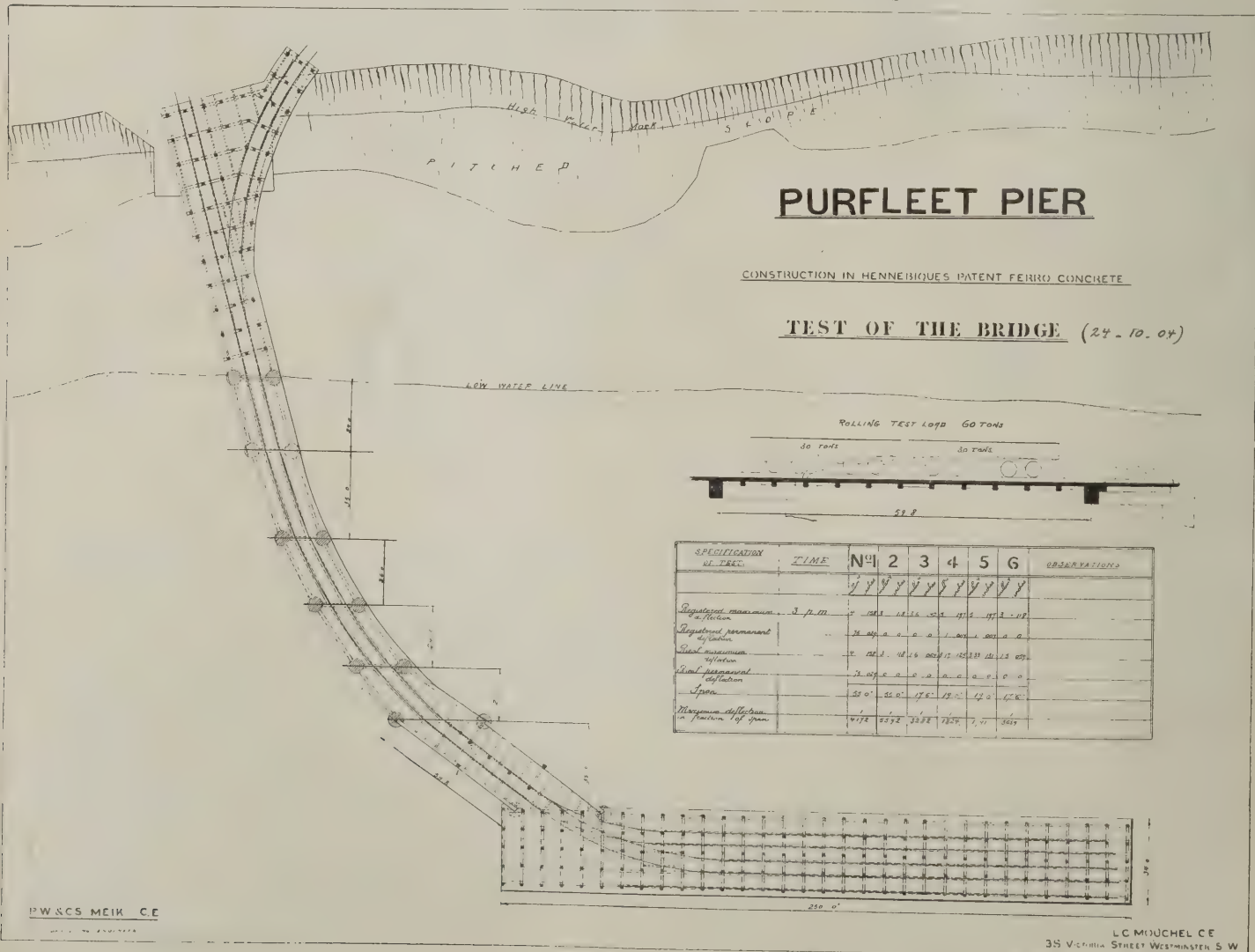
Flamboyant Window discovered at Peterborough Cathedral.—At Peterborough Cathedral, in opening one of the bricked-up arches in the passage leading from the cloisters to what were once the monastic kitchens, a complete window of beautiful flamboyant tracery, measuring roft. 6ins. by 5ft. 9½ins., has been revealed, the sill being nearly on a level with the present path.



PURFLEET PIER: VIEW LOOKING THROUGH CONCRETE PILES.

New Warehouse Premises in the City.—Large warehouse premises have been built at Nos. 13 to 22, Bridgewater Square, and 8 and 9, Hart Court, E.C., from the designs and under the supervision of Mr. George Vickery, architect, of 50, Gresham Street, E.C., by Messrs. Patman & Fotheringham, Ltd.,

builders, of 100, Theobald's Road, W.C., and 290, Liverpool Road, Islington, N. (Mr. James F. Parker, managing director). The building has a frontage to Bridgewater Square of about roft. and 50ft. to Hart Court. The elevation is of Portland stone and red brick facings.



OUR PLATES.

THREE of the houses in King Street, Oxford, forming a symmetrical group in the block of five houses shown, have been built. The walls up to the first floor are faced with hammer-dressed coursed rubble in buff-coloured Braise Norton stone, the dressed stonework being in Guitingstone of a warm yellowish tint. The walls of the upper floors are faced in cement stucco with greyish brick quoins. The roofs are covered with Collier's red tiles. A peculiarity of the plan is the terrace at the back, which is carried out over the kitchen and servants' offices overlooking the gardens, and the outer wall-line of which almost exactly coincides with the line of the old City wall. The building has been carried out from Mr. Warren's designs by Messrs. Benfield & Loxley, of Oxford, for Merton College. The leaded glazing, casements, railings and grilles &c., have been executed by Mr. John Pye, of Moreton.

The sketch perspective of Inigo Jones's well-known water-gate to York House, near Adelphi Terrace, was prepared by Mr. John Swarbrick as a diagram to illustrate a comparatively simple method of projecting shadows. It is to be regretted that sciography is not more generally studied by architects and utilized in everyday practice. The gateway was erected about the year 1626, and some very interesting references to it may be seen in the account-book of Nicholas Stone, the mason, which is now preserved in the Soane collection.

The house at Knock was erected by Messrs. Robert Corry & Sons, of Belfast, under the supervision of Mr. W. J. Fennell, M.R.I.A.I., architect, from plans prepared by Mr. Frederick Core, of London. The materials are red brick and rough-cast for the walling and Westmoreland green slates for the roof. The woodwork generally is painted white.

JUNIOR INSTITUTION OF ENGINEERS.

THE annual report of this Institution states that the membership has risen to nearly 800 and the assets to close on £1,000. Mr. Samuel Cutler, junr., M.I.M.E., has been re-elected chairman. On October 22nd the members paid a visit to Messrs. Stuart's Granolithic stone works at Millwall Dock, Mr. Peter Stuart showing them over. He had considerably kept the machinery running so that all the processes in the manufacture of the stone could be seen. Electric power is used for the crushers and grinders, current being obtained from the public supply. There is also an electric elevated transporter running on a rail for conveying finished blocks between different parts of the works. Some striking examples of the strength of the material were shown, and tests were conducted on some of the specimens. Before the party dispersed Mr. Adam Hunter, vice-chairman of the Institution, expressed their acknowledgments for the kind reception which had been accorded.

On October 23th an inspection was made of the National Physical Laboratory, Bushey House, Teddington. Many beautiful instruments and appliances were seen, including some for testing wind-pressure, alternative stress, insulating material, temperature distribution in field coils, &c.

The opening meeting of the new session is to take place on November 18th, when Mr. W. H. Lindley, M.I.C.E., F.G.S., of Frankfort-on-Maine, is to deliver the presidential address, his subject being "Municipal Engineering on the Continent." An excellent programme of papers and visits has been arranged, and we can strongly recommend to our readers the advantages which membership in this Institution offers. Those desiring full particulars should apply to the secretary, Mr. Walter T. Dunn, 39, Victoria Street, Westminster.

R.I.B.A.

Mr. Belcher's Presidential Address.

THE opening meeting of the session of the Royal Institute of British Architects was held on Monday evening, Mr. John Belcher, A.R.A., presiding. The following nominations were announced:—

Fellows.

W. A. Aickman	A. V. Ingall (Birmingham)
S. N. Chandabroy (Bombay)	W. Leck (Johannesburg)
J. B. Chubb	W. T. Lockwood (Chester)
Bernard J. Dicksee	E. C. P. Monson
W. Dann	H. A. Pelly
F. Emley (Johannesburg)	E. R. E. Sutton (Nottingham)
A. C. Forrester	E. Thornton (Calcutta)
A. L. Guy	W. F. Young
G. A. Humphreys, A.R.C.A. (Llandudno)	R. Watson

Associates.

R. J. Allison	A. H. Gloyne (Richmond)
E. G. Allen (Croydon)	H. P. Gordon
W. H. Bagot (Alderside)	P. W. Hawkins
W. J. Ball (Crews)	B. Hooper (Dunedin, N.Z.)
E. Bates (Croydon)	V. Hooper (Redhill)
C. Batley (Kattering)	F. C. Pilling (Bilston)
W. E. A. Brown	K. D. S. Robinson
A. N. Campbell	G. A. Ross (Montreal)
W. A. T. Carter (Wimbledon)	T. T. Sawday (Leicester)
C. M. Childs	A. Scott, jr. (Glasgow)
B. C. Chilwell (Wednesbury)	N. O. Searle
C. B. Cleveland	R. E. Sewardson
N. Culley (Huddersfield)	F. E. Stratton
S. C. Curtis	P. J. Westwood
W. T. Curtis (Dulwich)	G. H. Widdows (Derby)
W. J. Davies (Sidcup)	F. Wilson (Sheffield)

Honorary Associate.

George Noble, Count Plunkett, B.L., F.S.A., M.R.I.A. (Dublin).

(Of London where not otherwise stated.)

Mr. Belcher then delivered his presidential address.

After referring to the popularity and ability of the late president, Mr. Aston Webb, and to the successful "At Homes" inaugurated by him (which will be continued), Mr. Belcher spoke of Liverpool Cathedral and the Queen Victoria Memorial, characterizing the former as probably the last Gothic cathedral to be built in our days, a building marking not only an event in architecture but in our national history: while of the Memorial he said that Mr. Webb had certainly made the most of his opportunities, and when all his design, including the arcading, was completed we might anticipate a result of which we should be proud. The present unfinished aspect of the work, from which the main architectural features were lacking, could give the public but little idea of the beauty and harmony of Mr. Webb's entire scheme. In this connection Mr. Belcher mentioned

that the very commonplace electric-light standards, to which so much exception had been taken, were only temporary, and would, he hoped, soon be replaced by others specially designed by Mr. Webb himself.

The Indian Memorial to the Queen had also been taken in hand. Owing to the nature of the site chosen, the foundations for the superstructure designed by Sir William Emerson had presented many difficulties, which, however, had been overcome by methods of considerable ingenuity.

The contemplated extension to the British Museum—so long needed—had been entrusted to Mr. J. J. Burnet, whose excellent Greek work in Glasgow fully entitled him to this distinction.

Among the events of the year was also the bestowal of the honour of knighthood on Sir Henry Tanner, whom they sincerely congratulated on so well-deserved a reward for his eminent services.

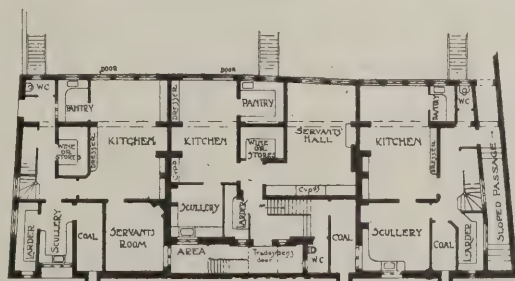
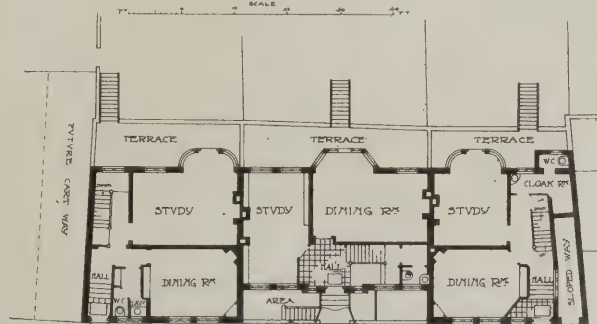
Before passing on, Mr. Belcher reminded his hearers of the Great International Congress of 1905, which is to be held in London under the patronage of the King, with the Prince of Wales as honorary president of the Congress. The occasion would be in the highest degree interesting and important—fruitful, too, in opportunities not only for advancing the true interests of their art, but also for drawing public attention to its value and importance as a factor in our national life and education. It was to this end that the Institute should always be directing its efforts. They were something more than a trade union.

The Institute's growing influence brought of course distinction to its members, which distinction, however, must be honourably earned—won, in fact, by force of merit rather than demanded as a right. The increase in their numbers gave proof of vitality and vigour, but this involved greater responsibility, and an obligation to let the audacity of youth give place to the growing caution and dignity of maturer years and riper experience. They might, perhaps, differ among themselves as to the true line of advance, but they were all, he believed, actuated by the same loyal desire, and all ambitious to see the Institute firmly established in the honourable position it had earned. They must see to it, then, that the foundation was secure before they attempted to add to the superstructure. In other words, they must know something of their limitations as well as of their influence and power,

bearing in mind the old lesson of the nut and the nutcrackers—if the crackers were not strong enough to crack the nut, the nut would assuredly be hard enough to break the crackers.

The Institute as a corporate body had a duty towards the whole profession, and its Council, in weighing the many difficult problems that came before them for solution, had to remember this greater responsibility, this more extended obligation.

One such subject was registration. This was apt to be somewhat hastily regarded as a panacea for all ills, so that the very sound of it breathed comfort, like "that blessed word Mesopotamia" in the story of the old lady and the sermon. The simplicity, however, of the operation or process of registration was not to be taken for granted. A clear definition of its practical working and effect would no doubt be elucidated in time; but as this was the task upon



HOUSES IN KING STREET, OXFORD. E. P. WARREN ARCHITECT.

which the committee specially appointed by the general body was now engaged, he felt it would be better for them discreetly to keep silence until the committee had reported upon it. Moreover, as there was considerable diversity of opinion, it would be well to hear both sides before coming to a decision.

Education.

There was, however, one matter, affecting both themselves and the allied societies, upon which they were all agreed, namely, the special education and equipment necessary for an architect. Some carefully-devised scheme of training was in reality that proper foundation to which he had alluded, and must have precedence of all other claims upon their time and attention.

He congratulated the Institute that during the past session an efficient "Board of Architectural Education" had been established, and he was glad to state that Mr. Webb would continue to act as chairman of the Board. Their scheme would shortly be before the members, and, he hoped, would soon be in active operation.

The Public.

Another cause for congratulation was the growing interest of the public in architecture—an interest evidenced in a variety of ways. It was obvious that side by side with a more systematic training of the architect, some attempt should be made to educate the public. At the very least they might set before them fundamental principles and elementary axioms, that they might know what to appreciate and what to avoid. This might be partially accomplished by lectures in the large cities and towns, under the patronage of the local authorities; also by the distribution of short papers or pamphlets on the subject for the use of schools, art teachers and others.

Unfortunately, at our great centres of learning, which should have given a lead in this matter, the study of architecture had been made subservient to archaeology, with the result that architectural work of all sorts had been judged and appreciated (or the reverse) not upon its merits but according to its antiquity.

Technical Institutes.

But it might be asked, Were not the technical schools educating the people in a knowledge of architecture? Scarcely. They imparted a knowledge of the methods and science of building construction, but what was needed by the general public was not so much a technical knowledge as a discriminating taste moulded and set upon elementary principles, a discrimination which would enable them to approve what was excellent and reject what was inferior.

In the eighteenth century the education of a gentleman was not considered complete unless he had acquired some knowledge of the rudiments of architecture and a refined taste in the appreciation of its beauties. Too often, it was true, the dilettanti thus inspired attempted to express their ideas without the aid, or with only the partial aid, of the professional architect, but the interest in and appreciation of art which prompted them was one which we might well seek to revive. In this good cause he believed the power of the Press might be reckoned on.

The New Art.

In these days, supply (of a sort) followed hot-footed upon the heels of demand, and the quickened public interest in art was promptly met by the abominable affectation of what was known as *l'art nouveau*. A new art forsooth! A pernicious trick easily acquired and applied alike to buildings or jewelry, furniture or dress; no matter what the nature of the material, whether iron or wood, stone or glass, all alike twisted to curves representing the final stages of vegetable decay and animal decrepitude, in

defiance of all true principles of construction and beauty.

Mr. Belcher next referred to the influence of environment, the functions of good architecture, and the bad effects of ill-designed buildings; then passing by in brief review the coarseness and vulgarity of business premises, the disfigurement caused by advertisement signs, and the increased height of buildings, he came to the subject of public improvements, observing that consultation and advice might be sufficient in many cases, but in others the First Commissioner should have power to decide and determine. Artistic needs must be insisted upon, more particularly where considerations of finance were likely to exercise an undue if not tyrannical sway.

London Improvements.

Quite recently, when some important improvements were suggested in the Strand frontage of the new street, the members of the County Council appointed to meet the artists belonged to the Finance Committee of the Council, and, as was to be expected, showed but little sympathy with artistic ideals. Yet artistic treatment had a financial value of its own, as owners of property were beginning to find out. Sir Arthur Conan Doyle, while recognising the desirability, even the necessity, of a strain of artistic blood in the body corporate of the London County Council, did not seem very sanguine, for he calculated it would take a man with the talent of Michael Angelo, the despotic power of Napoleon I., and the all-round energy of the Kaiser Wilhelm to make this London of mean streets what it should be—a fitting centre of the greatest empire the world had ever seen. No doubt the qualities here so tersely epitomized would prove advantageous, but how much might be accomplished in this direction if only the First Commissioner of Works, acting as a Minister of Fine Arts, with the aid of an Advisory Committee, possessed the necessary despotic power to see the right proposals adopted. In France and the United States some such exercise of authority had been found necessary. Why not here?

Ancient Lights.

Speaking of these, Mr. Belcher said they owed a debt of gratitude to Mr. Howard Colls for boldly withstanding the legal opinions of the Courts and appealing to the House of Lords. A clear and satisfactory judgment had thus been obtained on the question, establishing a principle of law which would relieve both property owners and the public from formidable restrictions. It would not be forgotten that an Easement of Lights Bill, introduced by Mr. Fletcher Moulton, K.C., on behalf of the surveyors and themselves, had been before Parliament the last two sessions, and steps would be taken to continue its promotion when Parliament met again. The Bill covered the ground of the *Colls v. Home and Colonial Stores* case, and provided a simple machinery for arbitration.

Air and the Growth of Suburbs.

Light and air had long been bracketed together. In one important respect, however, air called for separate and independent consideration. In the extension of suburbs of cities and towns the public health demanded that the buildings should be farther apart and the open spaces larger the further they were removed from the centre. In Germany the authorities regulated the growth of their suburbs. Different heights and different degrees of proximity were prescribed according to the locality. Towards the centre five storeys was the limit, reduced to three farther off, and then the houses must be detached. In certain directions a larger area must be reserved for the wind to blow freely about the houses. Our London suburbs

were becoming a source of considerable danger. Here the houses were indeed smaller, but they were so closely packed and crowded with unhealthy subjects that the air which passed over them to the centre was becoming denser and more impure every succeeding year, and should a serious epidemic occur the spread of contagion to the great centre, and thence again outwards, seemed inevitable. He commended this matter to the attention of town councils.

The Borough Surveyor.

One of the questions raised by Mr. Webb, and still under the consideration of the Council, was the growing habit of employing the borough surveyor or engineer on what was really professional architectural work. It was true this official was usually a man of considerable capacity, but the very nature of his ordinary and proper work stood in the way of architectural or artistic accomplishments. The Committee appointed to report upon the subject had done so in a very thorough and excellent manner. They had ascertained the custom and conditions existing in other countries, and the result of their labours would be condensed and published in the "Journal." It was proposed to take steps to bring the matter to the notice of the public authorities and others concerned.

It had been urged with much show of justice that the Institute ought to afford help and protection to its members in legal matters, when these matters were wrongly forced upon them, and were of such a character as to prejudice the interests of the profession. The principle had been approved by the Council, and a Board established, called the Board of Professional Defence, which, under proper restrictions, would be empowered to deal with such cases as came within the above category.

Modern Architecture.

In conclusion Mr. Belcher referred to the condition of modern architecture in this country. Those who were inclined to regard it as a dead art were already awake to the fact that there was more vitality and advance being exhibited here than anywhere else. It was not to be thought, however, that their friendly critics had not been discriminating. "A man," said Ruskin, "may hide himself from you in every other way, but he cannot in his work—there you have him"; and our critics had had us, sometimes, to our confusion of face before them.

Architecture must tell its tale; it had its message to deliver. Like a musical score it expressed a great deal more than met the eye. Its meaning was hidden behind the veil of outward symbol. It was the prose of inarticulate but beautiful thought and feeling. It recounted the past, recorded the present, and held up ideals for the future. But only when it was enriched from the sister arts of sculpture and painting could it tell the tale with fulness of eloquence and power—for then it spoke to the heart in tender and solemn tones of all that was most grand and beautiful in life and humanity.

It was a pleasure to see that much had been done in recent years to cement and confirm the alliance of the arts. The brotherly readiness of the sculptor to aid in the goal cause should be recognized, and his name coupled with the architect's in all such work. And when the painter's art was called in, then like the vibrating strings with their soul-stirring chords, the refinements of tone and colour appealed to the heart with a new and higher power based upon the primal sympathies and emotions of the human breast.

Why, then, had these arts so few opportunities of joint action? Was it not because architecture had forgotten her place and lagged behind? Was she not like Lot's

wife? Looking back, there lay the explanation.

The sister arts of painting and sculpture had been the while advancing, but architecture had stopped short and been content to look back to the past, to draw upon old periods and reproduce "defunct" styles, so that the living arts of the present age could no longer associate with one that was a mere mouldering survival from bygone times.

But all this, he believed, would soon be past history, a vanished nightmare, for a new era had undoubtedly begun. After all, the great thing was not so much where we were standing as in what direction we were moving. Let us be enthusiasts. Our national architecture was not dead; the spark was there; blow upon it and the fire would burn. Let them encourage and stimulate the energies of those who, with the love of their art burning brightly, sought not arrogantly for something new, but to advance that which they had proudly inherited and to make its influence for good ever more and more known and loved.

A vote of thanks to the president, proposed by Mr. F. Dicksee, R.A., and seconded by Sir B. Baker, was accorded with acclamation.

A NEW POST-OFFICE.

SOME of the building construction students at the Northern Polytechnic Institute recently paid a visit to the new Northern District Post Office in course of erection on a site in Shedd Street, Upper Street, N. The superstructure is being carried out by Messrs. Howell J. Williams & Sons. The students were first shown a fine set of $\frac{1}{4}$ th scale drawings from H.M. Office of Works, and also the details of wood and iron construction. They were then conducted over the building while Mr. Skrase, the foreman, informed them as to the materials, &c. The building is practically a parallelogram on plan, being about 159ft. by 162ft. The walls are faced externally with red pressed bricks and Darley Dale stone dressings, the staircases, &c., internally being faced with Ruabon salt-glazed bricks. The floors are all solid, of concrete composed of furnace ash and Portland cement, 6 to 1. All steps and pavings are Granolithic. The building has a main roof with smaller side roofs to allow for future extension. Both the roofs and floors are of steel construction, the main roof having a span of 74ft. with 25ft. between trusses. All steel-work is by Messrs. Dorman, Long & Co. Both the roof and floors have been suggested as exercises in graphic statics for the students in class at some future date.



Birthplace.

Hornby Cottages.

New Library.

HENLEY STREET, STRATFORD-ON-AVON.

THE STRATFORD COTTAGES.

CONSIDERABLE interest has been shown, especially by some well-known literary and dramatic people, in the Stratford-upon-Avon Free Library scheme, or, as some have termed it, the "Spoliation of Henley Street." The accompanying photographs show the "old china shop" after being uncovered last year, the "Hornby cottages" as they now stand, and the new library. The "china shop" property has been restored, with slight alteration and several additions, adapted to the uses of a free library. Existing leases show that in 1563, a year before Shakespeare's birth, the place was occupied by a Gilbert Bradley, glover. The property was thus built about the middle of the sixteenth century. It was originally owned by the Stratford Guild, and passed from that body to the Corporation. When under the Act of Dissolution the possessions of such fraternities became vested in the Crown, the Duke of Northumberland secured under a new form the property of the Stratford Guild for the town. Of the four cottages purchased by Mr. Carnegie and presented to the town, the two adjoining the Birthplace have been demolished. The remaining two, called the "Hornby cottages," contain some timber framing and a timbered roof, but nothing is left of the old timbered front, which gave way to the present quiet and well-proportioned red brick front. These tenements are thought to have been originally one

house, and to have belonged to a Mrs. Nash, grand-daughter of William Shakespeare. The work has been successfully carried out by Mr. E. G. Holtom, architect, of Stratford-on-Avon. FRANCIS D. B. YORKE.



VIEW SHOWING NEW LIBRARY IN RELATION TO ITS SURROUNDINGS.

Obituary.

Mr. Chester Foulsham, district surveyor for St. Leonard, Bromley, died on October 28th, aged 67.

Mr. William Topliss, timber and stone merchant, of Chesterfield, who died on October 6th, aged 83 years, left estate which has been valued at £59,524.

Mr. B. T. Batsford, the well-known architectural publisher, died last week and was buried on Monday. Our notice of the deceased is held over till next week.

Mr. W. H. F. Sames, of Blackburn, died recently, aged 40, after a long illness. He was a partner with his brother (Mr. G. G. Sames, J.P.) in the firm of Sames & Green, architects, of Blackburn and Darwen.

Mr. Richard Hardy, brewer's and maltster's architect and civil engineer, of Nottingham, died on November 1st. The practice will be carried on by his chief assistant, Mr. C. A. Broadhead, A.R.I.B.A., until Mr. J. C. Hardy (eldest son of the deceased) has completed his articles.



THE NEW CARNEGIE LIBRARY STRATFORD-ON-AVON.



From the Rear.



From the Side.

THE "CHINA SHOP" AT STRATFORD-ON-AVON, AS UNCOVERED LAST YEAR.

THE AIR OF THE CITY TEMPLE.

WITH the object of testing the efficiency of the new system of ventilation which has been installed in the City Temple Church three samples of air were collected by Dr. W. H. Hurtle, of St. Bartholomew's Hospital, and tested for carbon dioxide. The church was crowded in every part, so that there must have been between 2,500 and 3,000 persons present. The air was collected during the singing of the last hymn. On analysis the samples gave the following results:—Body of church, 8.2 volumes of carbon dioxide in 10,000 volumes; north gallery, 9.6 volumes; and west gallery, 5.1 volumes. A determination of the carbon dioxide in the open air gave 4.2 volumes in 10,000 volumes. In some preliminary experiments in connection with the instalment of this system of ventilation a determination of the carbon dioxide was made in the shaft which runs south to north over the centre of the church and carries the vitiated air to the extraction fan. One of these determinations was made before and another just after the new system was introduced, both at the conclusion of the Sunday evening service. The results were:—Old system, 29.8 volumes of carbon dioxide in 10,000 volumes; and the new system, 13.6 volumes. These results show that a great improvement has been effected in the ventilation of the City Temple. Fresh air is taken through two inlets, each 5 ft. by 3 ft., guarded by 10 ft. walls which ensure the air being taken that height from the ground. Each inlet is provided with an atomizer, which consists of an arrangement for filling the whole aperture with an extremely fine spray of water, so that the air is washed. A short distance from the inlet two hair screens, each of about 25 sq. ft., are placed and these filter the air, which then passes through a short tunnel having concrete walls to an electrically driven fan capable of delivering one and a quarter million cub. ft. per hour, and thus of renewing the whole

air of the church four times per hour. From the fan it is passed through a heating apparatus into the church. The vitiated air is withdrawn through gratings under the galleries and in the ceiling of the church into the shaft before-mentioned by another electrically-driven fan placed in the north-west turret of the building. The work of ventilation was carried out by Messrs. G. N. Haden & Sons, 123, Cromer Street, W.C.

Law Cases.

Sewers on a Building Estate.—The case of *Graham v. Ramuz* was recently heard before Mr. Justice Phillimore and a special jury in the King's Bench Division. The plaintiff claimed damages against the defendant, the vendor, for breach of contract to lay sewers for the drainage of houses to be built on land at Herne Bay. The conditions of sale were included in a catalogue, on the front page of which were the words: "Roads made, drained and kerbed." No. 6 of the conditions of sale contained the words: "Thirty shillings per plot shall be paid by each purchaser for the connection of the drains with the sewers when the roads are made and sewers laid." The conveyance recited the agreement of sale, but contained no stipulations as to drainage. The roads were not included in the conveyance. Pipes for sewers had been laid, but, owing to prolonged differences between the defendant and the urban district council, no outfall had been provided; and the plaintiff claimed damages for loss suffered owing to inability to drain houses (some of which had been erected) on the plots, and hence to get their plans passed by the local authority. His Lordship held that, on the construction of the document—apart from the words on the front page of the catalogue—there was a warranty that there should be sewers. The jury agreed, and awarded the plaintiff £500 damages.

HOW MACADAM MADE HIS ROADS.

ABOUT 1800, when Macadam commenced his road-making experiments, the roads throughout Great Britain, but especially in Scotland, were very bad. They were made mostly with gravel or flints tumbled upon them in their natural state, and so rounded that they had no points of contact and rarely became consolidated. Macadam arrived at the conclusion that roads should be constructed of a series of thin layers of hard stone broken into angular fragments of a nearly cubical shape and as nearly as possible of the same size; no piece was to weigh more than 6 ozs. The layers of broken stone were to be consolidated gradually by the passage of the traffic, and the covering of the road would thus become a firm and solid platform, nearly impervious to water and durable in proportion to the hardness of the stone of which it was made. Granite, greenstone and basalt were at first thought best suited for the purpose, but basalt proved ineffective. Before the introduction of the 2 in. ring and 6 oz. weight for testing stones, Macadam used to bid the stone-breakers use their own mouths as a gauge. If the stone would not go into the mouth it was too large for the road.

In 1815 Macadam became surveyor-general of the Bristol roads, and at once put his theories into practice on the highways of his district. Eight or nine years later the success of macadamization was generally recognized, and the question arose whether the system could supersede the rubble-granite causeways in large towns. A committee of the House of Commons was appointed to consider the subject on Macadam's petition, and after he had given evidence in favour of the extended application of his process his views were adopted. In 1827 he was appointed general surveyor of roads, but declined an offer of knighthood. He died at Moffatt, Dumfriesshire, in 1836. (Extracts from an article in the "Estates Gazette.")

Electrical Notes.

The Electrical Contractors Again.

The body now known as the Electrical Contractors' Association (Incorporated) has started its incorporated existence by a very militant attitude towards the contractors. Recently the two associations comprising the London and the provincial contractors amalgamated under this new title, no doubt with a view to greater strength in order to carry out their policy. Like all associations of this sort, when carrying out the legitimate object of mutual protection and organization no one can but sympathize with them and wish them well. But when such combinations are used to obtain advantages exclusive to their own members, and at the expense of the other poor individuals who are outside the sacred pale, then resistance must be anticipated and the side which has the longest purse is bound to win. In the present instance it is the contractors against the manufacturers. The former, wishing to force the hands of the latter to prevent them giving discounts to any persons outside "the trade" (a rather vague definition), caused the manufacturers to combine in order to mutually protect each other, and the result was the Electrical Manufacturers' Association. Finally, as is known, an agreement was made between the two London associations in which the manufacturers agreed not to give the discounts and to reserve an extra 2½ per cent. to all members of the Contractors' Association, whilst the latter agreed to buy exclusively from the manufacturers. It is common knowledge that the agreement, which was signed about a year ago, is a farce, and that neither side has carried its terms out in the letter, if even in the spirit. In order to protect themselves, the manufacturers have now given formal notice to

end the agreement on December 31st. At a recent meeting of the Electrical Contractors' Association it was resolved, in case this notice should be confirmed, to instruct the Central Board to make enquiries as to the possibility of instituting an electrical-supply house on the co-operative principle. This is a threat that the manufacturers need not trouble much about. In the first place, all the contractors have not joined the Association; secondly, such a supply house, if instituted, would be the inevitable cause of the tumbling to pieces of the Association, as the members are not loyal enough to each other to buy in any but the cheapest market; and, thirdly, it would only be necessary for the manufacturers, with their better financial resources, to open and successfully carry on a few retail wiring establishments of their own in order to bring the contractors to their senses. Before the latter attempt to carry out such a high-handed policy as seems to be expected, they should put the wiring business on a better basis by fixing a standard of work, abolishing cutting as at present in vogue, and weed out those of their members who only serve to bring the electrical wiring business, and therefore the progress of electricity, into discredit. A.M.I.E.E.

Trade and Craft.

The Pneumatic Closet.

Messrs. Adamsez, Ltd., of Scotswood-on-Tyne, have introduced a very ingenious and serviceable closet which dispenses with the usual pull and chain, being operated instead by pneumatic action. Depending from the cistern is an air-pipe which terminates in a small bellows fixed to the wall with a "push button" over it. That is the whole arrangement. One has only to push the button in order to start the flush; or, in another

pattern, this is automatically effected by the rising of the seat. Such an arrangement is bound to meet with a large demand because it is so admirable; moreover it is lasting, the only portion liable to wear being the small and inexpensive bellows, though we are assured this will keep in good order for at least five years under ordinary conditions. The price of this pneumatic set, including 3-gallon fireclay cistern, push apparatus, fireclay closet, trap, and wood seat, is £5: with seat-action, 10s. more.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending November 4th twenty-five failures in the building and timber trades in England and Wales were gazetted.

J. TRENDALL, timber merchant, Crowthorne. First meeting, Queen's Hotel, Reading, Nov. 12th, at 11. P.E., Assize Court, Reading, Nov. 10th, at 2.

C. J. GLADDEN & H. HARLAND, brick manufacturers. Langley. R.O. Oct. 24th.

HOBGSON & BIRD, builders and contractors, Birkenhead. Adj. Oct. 25th.

A. J. DANIELS, builder, Portsmouth. R.O., Oct. 21st. First meeting, O.R.'s, Portsmouth, Nov. 11th, at 3.

P.E., Portsmouth C.C., Nov. 28th, at 11.

G. H. HATTON, builder and contractor, Ashford. R.O. Oct. 29th.

E. HARGREAVES, painter and decorator, Padibham. P.E., Burnley C.C., Nov. 25th, at 10.45.

M. DAVIES, builder, Liverpool. R.O. Oct. 26th.

COCKEDGE & Co., timber merchants, London. R.O. Oct. 31st. First meeting, Bankruptcy Court, Nov. 10th, at 12. P.E., same, Nov. 30th, at 11.

A. E. WALLER, builder, Tottenham. Adj. Oct. 25th.

BAKER & CLARK, builders and contractors, Yeovil. R.O. Oct. 29th.

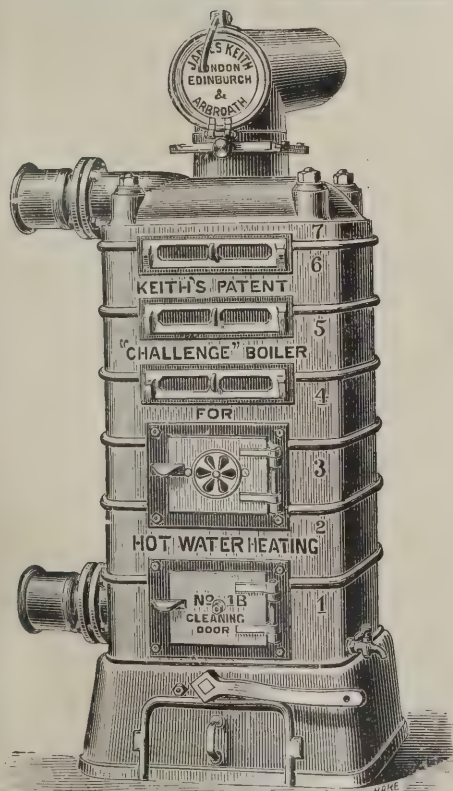
J. DOOLEY, builder, Tooting. R.O. Oct. 25th.

E. PARSONS & Co., builders and contractors, Putney. Adj. Oct. 25th.

CRANBOURNE & CRANBOURNE, builders, London. P.E., Wandsworth C.C., Nov. 10th, at 12.

W. WARREN, builder and contractor, Chiseldon. R.O. Oct. 28th.

CHARLES BROTHERS, builders and contractors, Birmingham. First meeting, 174, Corporation Street, Birmingham, Nov. 14th, at 11. P.E., Birmingham C.C., Dec. 1st, at 2.



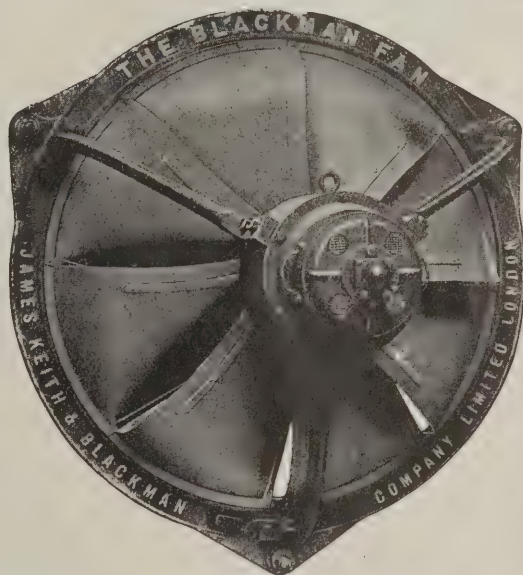
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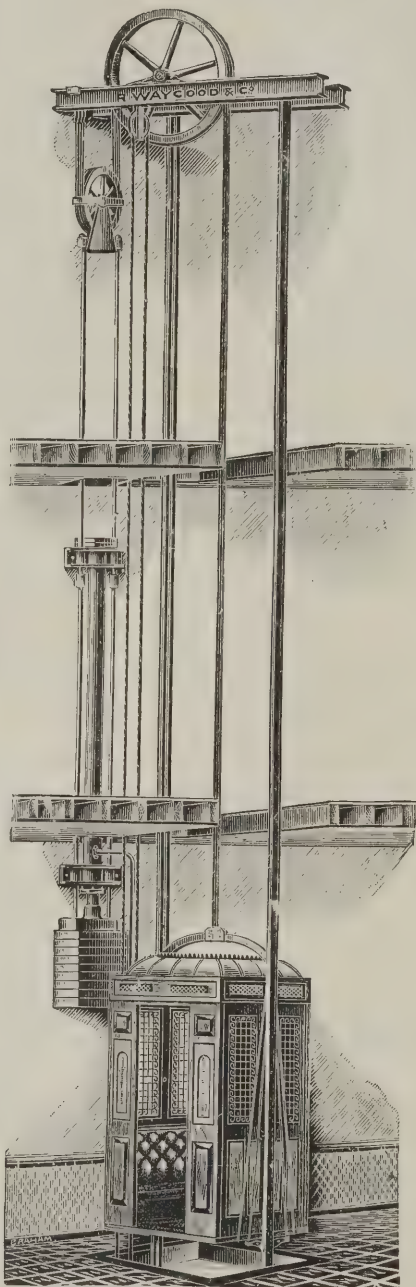
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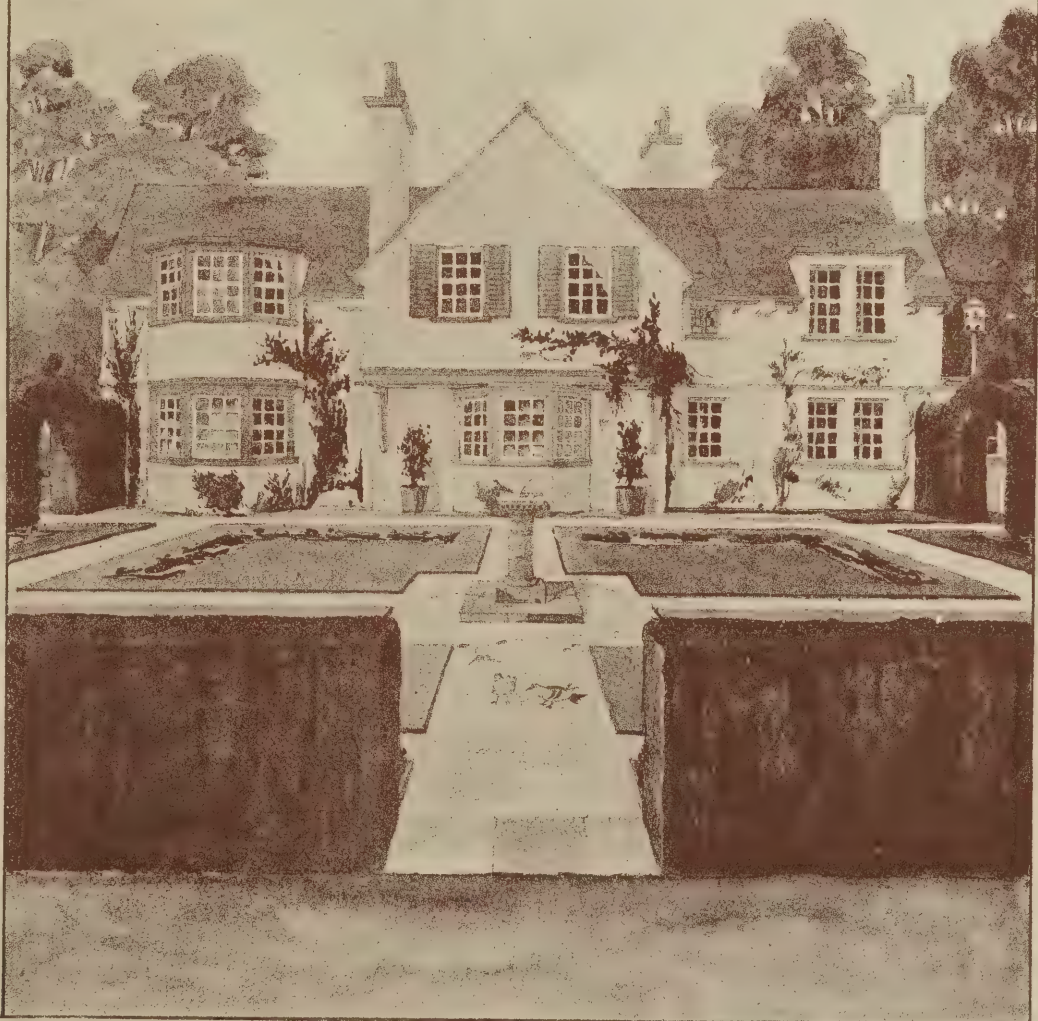
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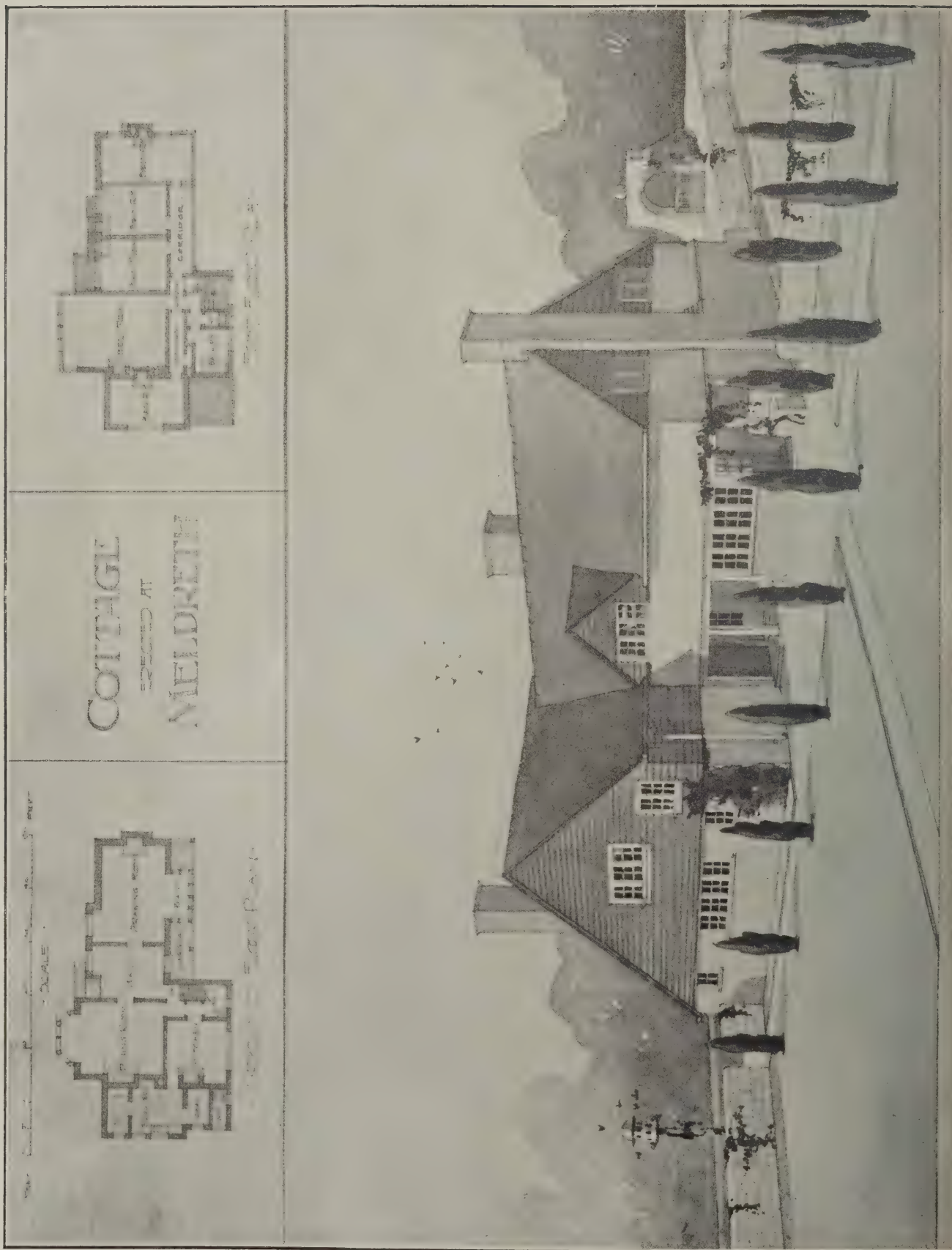


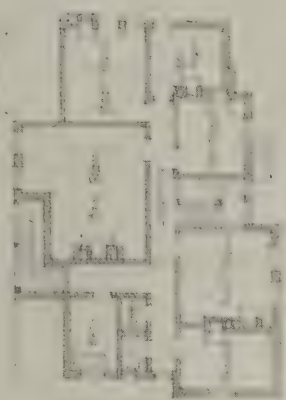
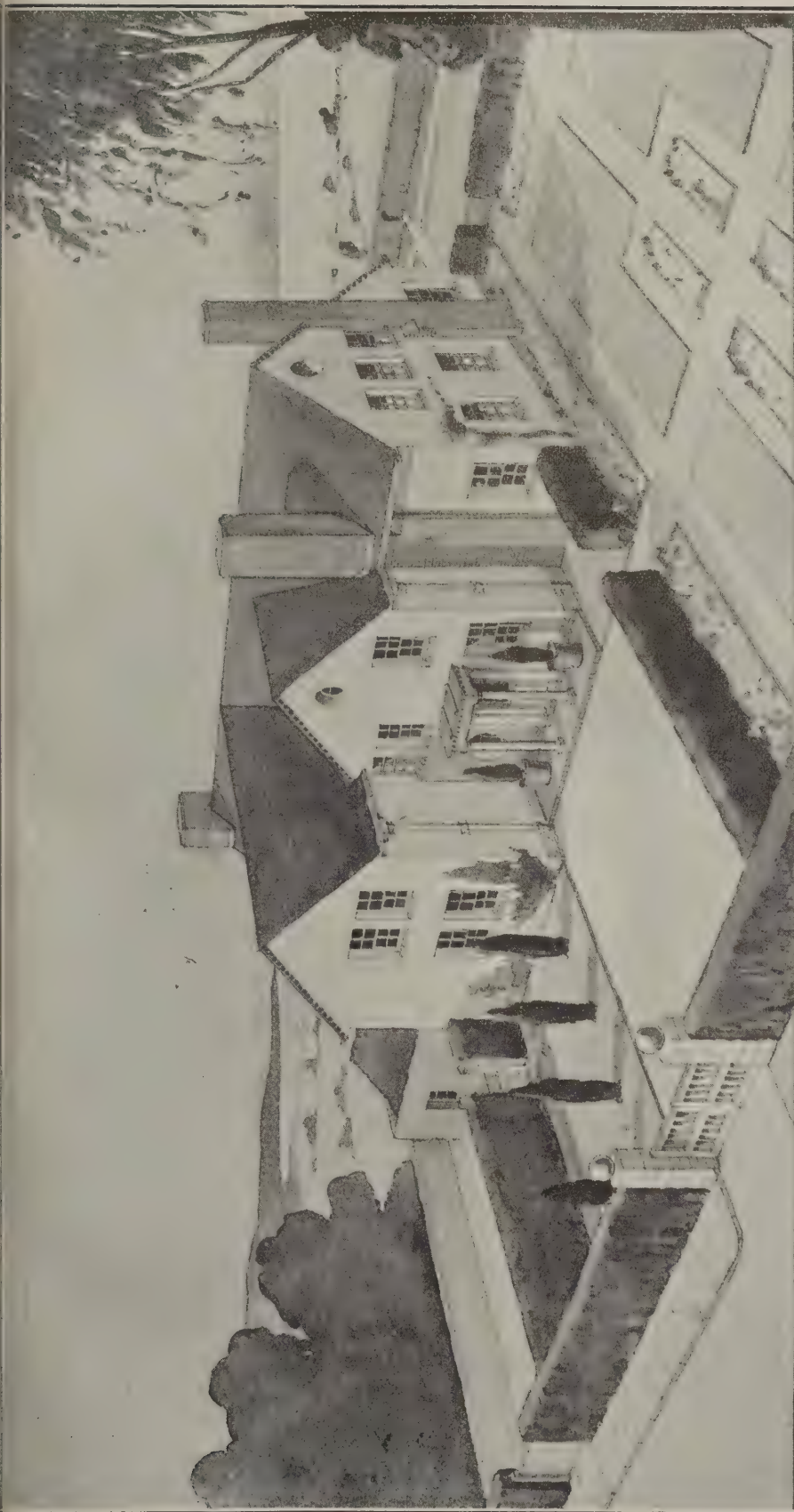
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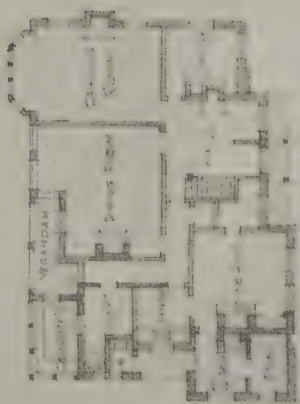
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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, November 16th, 1904.





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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

November 16, 1904. Vol. 20, No 510.

6, Great New Street, Fetter Lane, E.C.

Summary.

It is recommended that the new London Building Act shall be amended so as to give greater control over the construction of new streets in order to make more direct communication and prevent the formation of *culs-de-sac*, to restrict the height of buildings according to the width of streets, to strengthen the powers of the Council with regard to the erection of buildings in advance of the general line of buildings, to secure increased space at the rear of houses, and maintain it, to ensure better lighting and ventilation of basements, to provide means of escape from fire, to secure fire-resisting construction, to permit the uniting of buildings and the use of iron and steel construction, to license wooden buildings, to supervise dangerous businesses, to regulate building on low-lying land, &c. (Pages 257 and 258.)

A drain becomes a "sewer" from the point where it first receives the sewage of more than one building. (Page 265.)

The building trade at Sunderland and Hull is very depressed. At Hull the working hours have been reduced to seven per day, so as to give employment to more men. (Page 260.)

The ventilation of a room by means of the open fire is really by propulsion, not by extraction; the draught is caused not by the heated air rising by virtue of any power of its own, but by being pressed upwards by the heavier cooler air around. Mr. Henman advocates downward ventilation. He puts the air-inlet about 2ft. below the ceiling, as nearly as possible in a central position over the fireplace opening. He points out that a large amount of air comes through the walls of a house and these should on no account be made impervious unless some mechanical system of ventilation is adopted. (Page 261.)

The figures on Vauxhall Bridge are to be cast in bronze in full relief. (Page 259.)

Twelve candidates have been selected for the City Surveyorship. (Page 259.)

By the Powell process of using sugar to displace the air in the pores, timber can be seasoned within a week or two of felling, while improving its strength, porosity, resilience, &c. (Page xi.)

508 non-provided schools in London handed over to the County Council by the recent Act are being reported upon by Mr. T. J. Bailey, the educational architect, as fast as he can. He has already reported adversely on twenty-nine. (Page xi.)

Our new Fire Supplement. READERS will find this Journal surprisingly bulky next week, for in that issue will appear the first of the monthly fire supplements which we intend to publish. In these supplements we shall bring together a vast amount of interesting and valuable information concerning the construction and equipment of buildings in relation to fire protection, and, bearing in mind the wide scope which this subject can legitimately command, we shall also introduce fire-brigade and insurance matters, and those connected with the civil engineering aspect of fire protection. Our aim is not to supply a news supplement, but one essentially practical and constructive. It will thus consist for the most part of articles illustrated by diagrams, plans and numerous photographs. We have secured the services of Mr. Edwin O. Sachs as consulting editor, which in itself is good evidence that the Supplement will be authoritative, remembering what a high place Mr. Sachs holds in the fire world, both here and abroad. In all, the Supplement will comprise sixteen pages, and though of course that is making our Journal half as large again as it is now, no extra charge will be made. We must leave further details of it till next week, when readers will be able to see for themselves what our object is and how we intend to achieve it.

The London Building Act Bill. THOUGH the proposals of the Building Act Committee of the London County Council given on p. 257 are in a somewhat nebulous condition, we can see dimly the form they will take in the Bill which is to be presented to Parliament next year. No indication is given in these proposed amendments that the majority of the objections raised by architects will be attended to; indeed, they promise to increase the severity of the by-laws. As regards the proposals to control the formation of new streets, we welcome anything which shall give greater control; for the present spectacle of streets being built without any regard to their surroundings, and solely with the idea of getting the greatest monetary return by squeezing as many buildings as possible on a piece of land, is lamentable. Any regulations of the height of buildings facing an important street are also to be welcomed; their value has been proved in Continental cities. The proposals which are suggested in respect to the prevention of and means of escape from fire are likely to meet with opposition. While admitting their efficiency for the object in

view, it is inadvisable that they should hamper progress or interfere with artistic design, such as has been too much the case with the existing and former building Acts, with regard to party walls projecting above roofs and beyond the eaves of cottages, &c. The present Act clearly needs revision, and, therefore, though we think there is much in the new proposals that requires alteration and amendment, we can only urge that no further time should be wasted in getting to work on it and presenting the Act this next session. It can be revised in the Committee stage. The precise details of the proposals not yet having been formulated, it is useless to waste energy in elaborating what they may or should be.

Sir Aston Webb, R.A. THERE are some men for whom everyone has a good word. We are sure this is so with Sir Aston Webb, whose presidency of the Institute was in every way a success. All architects will join in congratulating him on his knighthood. Now the profession counts six titles—Sir Aston Webb, Sir Rowand Anderson, Sir Thomas Drew, Sir Henry Tanner, Sir William Emerson and Sir Charles Nicholson (the last having received his title by succession from his father). And let us be generous! Shall we not include two more titled members—Lord Grimthorpe, beloved for his work at St. Albans; and that latter-day judge of architecture, Sir William Grantham!

Pickling Steel. THE pickling of structural steel was probably first done in connection with the steel flooring of the Williamsburg Bridge in New York City. The specifications for the 12in. channels on which the paving blocks are carried required them to be cleaned and painted with pure linseed oil while still hot from the rolls. When the time came to execute the work the specifications were changed so as to permit the metal to be cleaned in pickling baths. The channels were first boiled in a 10 per cent. solution of caustic soda to take off grease, and were then rinsed in boiling water. Afterwards they were dipped in a boiling 10 per cent. solution of sulphuric acid until all the oxide was removed. After being rinsed in boiling water, they were next dipped in a boiling 10 per cent. solution of carbonate of soda to free them from any trace of acid. Finally they were rinsed in boiling water, dried over steam pipes, and then treated by the Sabin process of enamelling.



MEN WHO BUILD.

No. 72.—P. MORLEY HORDER, F.R.I.B.A.

IN turning over the pages of some of the American magazines we are constantly amazed to see fine examples of modern Classic buildings side by side with the most ill-proportioned country houses, medleys of design which, however much conforming to Bacon's dictum that houses are made to live in, not to look at, strike one as the most inappropriate things that could ever be put on a country side: and the fact is even more surprising when we see that the very reason for such an unfortunate result is the particular effort which the designers have made to get a rustic-looking house, just as popular taste still fancies that a little footbridge over a stream in one's garden, or a summer house, is far best constructed of lumpy tree branches cut in half, crossed and nailed together, and covered wholesale with shiny varnish. Yet in out-of-the-way country places, beyond the reach of the speculative town builder, it is common to see the most delightful examples of cottage buildings whose builders were never animated with any straining after effect. These houses possess an innate charm which the others are totally devoid of, and they give the satisfaction attaching to thorough adaptation to surroundings. Therein, perhaps, lies the whole matter. But though one may copy them, it is difficult to gain possession of their secret. On paper they look austere simple, so that one would be prompted to introduce all manner of devices to relieve what seemed monotonous. In reality, however, there is no austerity, and with the gathering cloak of Time wrapped around them these country houses remain a charm to the eye at every season of the year.

We, in this country, may legitimately claim a greater measure of the best domestic architecture than anyone else, and it is probably by reason of the heritages which our forefathers have left that we have so many practising architects who are capable of designing houses fully possessing the old beauty, while being admirably adapted to the needs of the present day. These architects form a great school, and though there is much diversity of treatment among them, some following old models closely while others find outlet for their talent in essentially new directions, they all share in common the desire to gain effect by simple means.

The many country houses by Mr. P. Morley Horder, here illustrated are an excellent example of this. There is a quiet homely feeling about them, and the materials of

which they are built—brick rough-cast, tiles, and painted wood—give them a bright and cheerful appearance.

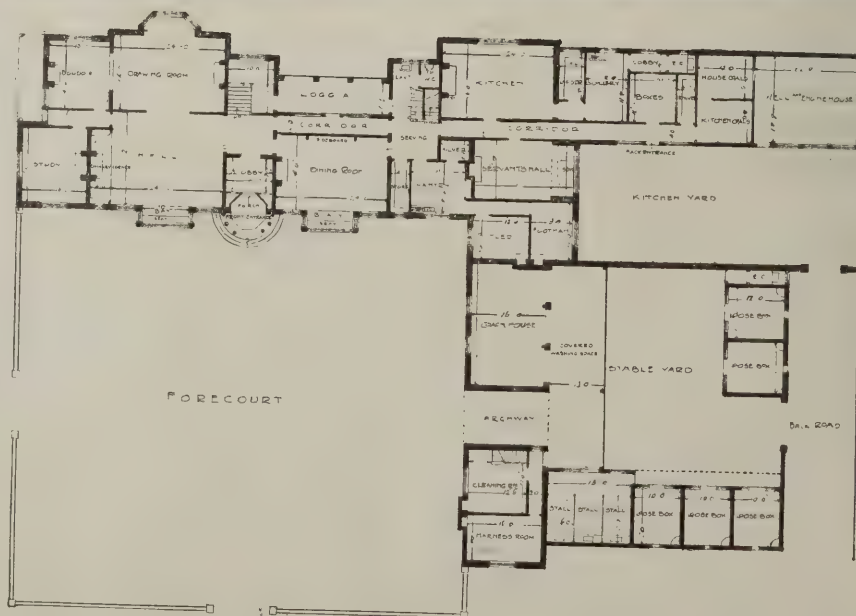
Mr. Horder has carried out numerous houses and decorative works in the neighbourhood of Gloucester and Stroud—more especially at the Grangé, at Rodborough Court, and at Farm Hill Park, Stroud; numerous houses in Sussex, near Hayward's Heath, and at Cuckfield, Nether Walstead, Lindfield; Hill Wootton House, Warwick; alterations and decorations at Sedbury Park, Chepstow; houses in North Wales; a large house near Winchester; and houses at Reigate, Tunbridge Wells, Haslemere, Upper Waulingham, Bournemouth, Tittleshall, Milford-on-Sea, Bexhill, &c.

Of numerous works in London carried out from his designs, there are two houses in Brook Street, W., shops in Bond Street and in the City, and various houses in and near the metropolis; while among works in hand

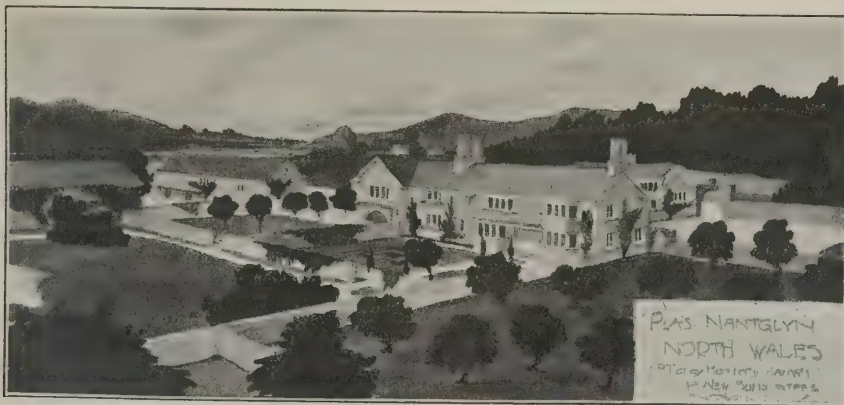
are extensive alterations and decorations to a house in Kensington Palace Gardens, a large house at Warwick and a mansion in Ireland.

A number of churches and schools have also been designed by Mr. Horder, including Muswell Hill Church—particularly successful in its interior effect—the Sir Henry Tate memorial chancel and screen in Brixton Independent Church, alterations to St. Paul's College, Stony Stratford, a memorial tomb to Robert Buchanan at Southend, mission churches at Canning Town and Bermondsey, churches at Leyton, Hackney, Bowes Park, Nailsworth (Glos.), and many others in and near London.

Mr. Morley Horder was articled to Messrs. George Devey & Williams, the well-known architects of numerous mansions in various parts of the country, and started practice in Bond Street in 1891. All his work clearly shows that he is a designer of considerable ability.



HOUSE AT WARWICK. P. MORLEY HORDER, F.R.I.B.A., ARCHITECT.



LONDON BUILDING ACTS AMENDMENT.

IN June last the London County Council instructed the Parliamentary Committee to prepare a Bill to amend the provisions of the Building Acts for introduction in Parliament in the session of 1905. It may be well to briefly indicate the steps which led up to this decision. On November 4th, 1902, the Council decided to introduce a Bill to amend the provisions of the London Building Act, 1894, relating to safety from fire. Subsequently on March 3rd, 1903, they decided not to proceed with the Bill, but to refer it to the Building Act, Fire Brigade and Parliamentary Committees, with a view to their advising the Council what form the Bill should assume. The Bill in particular dealt only with the question of safety from fire, and left untouched many other important questions with respect to which the London Building Acts had been found to need amendment; and as the Council had decided that this Bill should not be proceeded with in the session of 1903, the Building Act Committee felt strongly that any amended Bill should aim at securing all the amendments required. It was not found practicable, however, for three committees to prepare the material for a Bill of this character, so that on May 26th, 1903, the Council rescinded their former resolution, on the understanding that the Building Act Committee would undertake the work. This the Committee did, considering suggestions made by various committees of the Council, by the majority of the metropolitan borough councils, and by the Royal Institute of British Architects, the Institution of Civil Engineers, the Surveyors' Institution, the District Surveyors' Association and many other bodies. They also considered all the cases illustrating the weak points in the present Acts which they had noted since 1894; and, in addition, the by-laws and Acts in force in the principal provincial towns, and the by-laws in force in the urban districts around London were studied with a view to extracting any provisions that might be valuable in London.

As the result, they submitted a report to the Council on June 14th last indicating in very general terms the object of their proposals, and stating that they would submit details later. These details were submitted at last week's meeting of the Council, though the consideration of them was adjourned till this week.

The greater number of the suggested amendments were communicated to the Parliamentary Committee on June 13th, to enable the preparation of the Bill to be proceeded with, and the remaining suggestions have since been communicated. A draft Bill embodying nearly all the suggestions put forward was furnished to the Building Act Committee after the summer recess, and they have submitted their observations thereon to the Parliamentary Committee. Therefore, although the work involved in the introduction of the Bill is necessarily very great,

there is no obstacle to its being introduced in the next session of Parliament if the Council approves of the principles of the proposed amendments.

The Bill of 1903 was the outcome of the action of the Home Secretary, who, in August, 1902, wrote to the Council stating that, in view of the facts disclosed at the inquest on the victims of the Queen Victoria Street fire, he thought that the question of further legislation on the subject of safety from fire in high buildings required early consideration, and that any new legislation should take the form of an amendment of the London Building Act, 1894.

The present proposals of the Building Act Committee, while extending over the whole of the London Building Act, embody those contained in the 1903 Bill (given in detail in *THE BUILDERS' JOURNAL* for February 25th and March 4th, 1903), with considerable modifications made with a view to meeting, as far as reasonable, the criticisms passed on the Bill.

The recommendations of the Building Act Committee are as follows:—

That in the Bill to amend the London Building Acts, which the Council on June 14th, 1904, resolved should be introduced into Parliament in the session of 1905, provision be made—

New Streets.

(1) To enable the Council in the case of new streets and adaptations to ways of streets—

(a) To require greater width, lateral communications, connections with existing streets, reservation of land for connections to adjoining estates and the formation of such connections when required; provision of streets proposed to be laid out at a level different from that of the land immediately adjoining on either side.

(b) To alter the position, direction or level in order to make more direct communication.

(c) To prevent the formation of *culs-de-sac*.

(d) To secure an equitable incidence of the cost of paving and making up.

(e) To control and require, where necessary, the formation of back streets.

Widening of Streets.

(2) To facilitate the widening of existing streets by—

(a) Restricting, except under certain conditions, the height to which dwelling-houses may be erected in narrow streets and ways.

(b) Enabling the Council to keep back, without compensation, to a greater distance than 20ft. from the centre of the roadway, buildings to be used for business purposes.

(c) Restricting, except under certain conditions, the height to which any buildings within 20ft. from the centre



COTTAGE AT UPPER WARLINGHAM. P. MORLEY HORDER, F.R.I.B.A., ARCHITECT.



HOUSES AT STROUD.

of a street or way, &c., may be re-erected, and prohibiting the raising or extension of any such building without the consent of the Council.

Building Line.

(3) To strengthen the powers of the Council with regard to the erection and re-erection of buildings in advance of the general line of buildings; to enable the Council to control the line to which buildings may be erected where the general line has been destroyed by the demolition of buildings; and to provide that the building line in certain new streets shall not be within a certain distance of the centre of the street.

(4) To enable the Council to determine a building line on one or both sides of any important street at a distance not exceeding 75 ft. from the centre of the street; to acquire any buildings, land, or structures in advance of the line so determined, or to require any such buildings or structures to be set back to such line on payment of compensation; to provide that after the determination by the Council of such a building line no building or structure shall, without the consent of the Council, be erected or extended in advance thereof; to enable the Council to make new streets where necessary to continue a thoroughfare widened as aforesaid, or for the purpose of affording through communication, and to provide for the settlement of questions of compensation and for the necessary machinery to enable the Council to exercise the powers sought to be obtained.

Naming of Streets and Numbering of Houses.

(5) For certain amendments in the provisions relating to the naming of streets and numbering of houses in order to facilitate the discharge of the Council's duties with regard thereto.

Air-Space at Rear of Dwelling-Houses.

(6)-(a) To enable the Council to require the provision of space at rear in certain cases where it cannot now require it, and increased space at the rear of dwelling-houses, and to prevent the erection of buildings which are not subject to the provisions as to space at rear on sites which are surrounded by dwelling-houses, and upon which the erection of dwelling-houses would be prohibited for lack of air-space.

(b) For requirements as to open space with regard to all domestic buildings not abutting upon a street.

(c) For the maintenance at all times of the open space provided in accordance with the Act.

(d) For the better lighting and ventilation of habitable basements and of rooms which have no windows directly opening on to the external air otherwise than into a court enclosed on every side or open on one side only.



HOUSE, HILL WOOTTON, NEAR WARWICK.

Fire Provisions.

(7) For means of escape in case of fire and reducing risk of fire by requiring all buildings (new and old) exceeding a certain height to be provided with means of access to the roof (guard rails being provided where necessary), by reducing the height above which means of

escape can be required in new buildings, and applying the amended provisions to existing buildings after seven years; by requiring means of escape to be provided from new buildings in which there is sleeping accommodation for more than a certain number of persons, or in which more than a certain number of persons are employed (the provision to extend to existing buildings after seven years); by making provisions as to the construction of buildings containing sets of offices or chambers and the size to which such buildings may be constructed; by requiring proper separation to be provided between the two portions of premises used partly for trade and partly as dwellings where such premises exceed a certain size, and the provision of means of escape (special provision being made in the case where the shop portion projects more than 5 ft.); to prescribe rules for boarding and panelling and for the construction of new lift shafts (except in certain dwelling-houses), the rules to apply to existing lifts after seven years.

Uniting Buildings.

(8) To enable the Council to consent to the uniting of buildings under proper conditions, and to the erection of buildings of such cubical extent as the Council may deem it expedient to permit, and to permit and make regulations for the use of iron and steel construction in buildings.

Adjoining Owners.

(9) For certain amendments in the provisions of the Act relating to the rights of building and adjoining owners.

Wooden Buildings.

(10) For wooden buildings of certain dimensions being licensed by the Metropolitan Borough Councils, and for enabling the Council to secure after a certain date the removal of existing irregular buildings.

Dangerous Structures and Businesses.

(11) For certain amendments in the powers of the Council with regard to dangerous and neglected structures.

(12) To prohibit the carrying on of dangerous busi-

nesses except under licence from the Council, and to enable the Council to impose conditions, and to charge a fee for such licence.

Houses on Low-lying Land.

(13) To make the provisions as to building on low-lying land apply to buildings used or to be used wholly or in part as dwelling-houses erected on land which is so situated that the buildings cannot be efficiently drained at all times by gravitation into an existing sewer of the Council.

Tribunal of Appeal.

(14) For increasing the number of members of the Tribunal of Appeal from three to five, for one member to be appointed by the Council, but not to be a member of the Council, and for the fifth, to be a barrister of not less than ten years' standing, to be chosen by the other four, and to act as chairman of the Tribunal; also that no architect or surveyor practising in London shall be eligible for membership of the Tribunal, and that the powers of the Tribunal shall be restricted to the limitations of the section under which the appeal is made.

District Surveyors' Salaries.

(15) For the necessary amendments in the Council's powers with regard to district surveyors, to enable it to introduce a proper system of payment of district surveyors by salaries, and to make certain modifications in the fees payable to district surveyors.

Exemptions.

(16) For repealing, modifying or adding to certain of the provisions in the Act of 1894, giving total or partial exemptions from the provisions of the Act.

(17) For the other amendments indicated in the foregoing report, but not specifically included in the foregoing clauses of the recommendation.

The Lady Chapel of Liverpool Cathedral will be the gift of Mr. Arthur Earle, of Wavertree. The cost will be £25,000. The committee hope to have it completed by 1909.



DINING-ROOM, THE GRANGE, STROUD. P. MORLEY HORDER, F.R.I.B.A., ARCHITECT.

Keystones.

Mr. C. Fitzroy Doll, F.R.I.B.A., F.S.I., is the new mayor for Holborn.

An Exhibition of the Works of G. F. Watts, R.A., is to be held at Burlington House.

The Third Exhibition of the Arts and Crafts Society of Ireland was opened in Dublin last Thursday.

Messrs. Charles Heathcote & Sons, architects, of Manchester, have opened a London office at Savoy Court, Strand.

Society of British Sculptors.—The statutory meeting of this new Society is to be held as early as possible in December.

Competition for new Offices for Wigan Guardians.—The design submitted by Mr. Herbert Ogden, A.R.I.B.A., has been accepted.

A new Music-Hall at Lewisham is to be erected at the junction of Lewisham High Street and Limes Grove from designs prepared by Messrs. Owen & Ward.

Competition for Semi-detached Villas, Coadsaesen Building Club.—The trustees have awarded the premium of ten guineas to Mr. Basil C. Deacon, of Liverpool.

The Lion of Chæroneia.—The work of restoring and re-erecting this fine piece of sculpture (described and illustrated in our issue for April 6th last) has been completed.

"New Use of an Old Material."—The article under this heading in our issue for November 2nd was by Mr. C. R. Thickpenny, whose initials only were given at the time.

The Figures on Vauxhall Bridge in the panels over the piers, originally intended to be in low relief iron, are to be cast in bronze, in full relief, at a total cost of £9,600. Mr. Drury and Mr. Pomeroy have the work in hand.

Benwell Library Competition.—First premium (£75), Mr. Vernon Hodge, Teddington; second and third premiums (£40 and £25)—merged and divided—Mr. C. Leslie Cox, Ilford; Messrs. Davison & Gratney, Wallsend-on-Tyne; and Mr. G. H. T. Robinson, Wolverhampton.

Evading the Building Act.—"The London Building Act is constantly being evaded by structures being kept in. or zins. under 60ft. in height," said Dr. Waldo, the City coroner, last week. "The owners thus escape liability for providing means of escape, but expose the tenants to immense risks in the event of fire."

Two new L.C.C. Fire Stations have been built at Westbourne Grove (in Pickering Place, Royal Oak) and at Maida Vale. The site of the former cost £5,500 and the building £7,500; at Maida Vale, £2,300 and £7,300 respectively. The work has been carried out by the Works Department of the Council.

Monumental Brasses was the subject of a lecture which Dr. John Stokes delivered before the Sheffield Society of Architects and Surveyors on Thursday last. These brasses made their appearance in England in the thirteenth century, the earliest now in existence being that of Sir John d'Abernon, of Stoke d'Abernon, Surrey, dated 1277.

Alterations to L.C.C. Standing Orders.—At last week's meeting of the London County Council, on the recommendation of the General Purposes Committee, various alterations in the standing orders and regulations under the London Building Acts so far as they relate to the submission of applications under the Acts and to street naming and numbering were agreed to. These alterations do not introduce any new practice, but simply make clear to applicants what is required of them in the way of plans, particulars, &c., with a view to saving delay in dealing with applications.



PROPOSED SHOPS, STROUD.

Thomas Crapper & Co., Ltd.—The business of brass founders and engineers, &c., carried on at Marlborough Works, Marlborough Road, Chelsea, under the name of Thomas Crapper & Co., has been converted into a limited liability company.

The City Surveyor: Selected Candidates.—The following twelve candidates for the position of surveyor to the City of London

were selected by the Officers and Clerks Committee on Friday, and will be interviewed on another occasion, when the number will be further reduced to five:—Messrs. F. Brown, G. F. Carter, J. E. Crouch, J. B. Hallis, C. H. Mayson, G. W. H. Prescott, H. A. Pritchard (Swansea), A. W. Osborn, S. Perks, S. A. Stranger, F. Sumner (Plumstead), H. Theobald. (Rest of London.)



110 NEW BOND STREET, W. P. MORLEY HORDER F.R.I.B.A. ARCHITECT.



CHURCH, MUSWELL HILL, LONDON, N.

Builders' Notes.

Unfenced Machinery.—At Lambeth last week Mr. William Downs, builder, Walworth, was fined £5 and 16s. 6d. costs for not fencing a circular saw at his works.

Storm Floodings in North Kensington.—The London County Council have accepted the tender of Mr. D. R. Paterson; Camden Town, amounting to £30,713, for the construction of a relief sewer from Cornwall Road, Notting Hill, to Upper Addison Gardens.

Depression in Sunderland Building Trade.—The building trade in Sunderland is depressed, and the local master-builders propose to reduce wages. They have invited the trade unions to send representatives to a joint conference to discuss the matter. With the bricklayers a reduction of 1d. per hour is suggested, and the abolition of a rule that two hours' notice must be given before a workman can be paid off.

The Tariff Commission—Evidence on the timber and building trades has been taken by the Tariff Commission, but is not yet complete. Mr. H. H. Bartlett, of Perry & Co., builders and contractors, Bow, has been examined respecting the building trade, and the following in regard to the timber trade:—Mr. S. B. Boulton (Burt, Boulton & Haywood Ltd., London); Mr. W. V. K. Stenning (John Stenning & Son, Ltd., London); Mr. Charles Hopton (Hopton & Sons, London and Market Harborough); Mr. Ward Layle (English Brothers, Ltd., Wisbech), and Mr. W. C. Williams (Joseph Owen & Sons, Liverpool).

Builders' Foremen's Association.—This Association, which aims at promoting friendly and social intercourse among builders' foremen, extending knowledge by means of lectures and visits, and assisting members in distress, has just issued its report for the quarter ending September (Mr. George Thomson, editor). The lecture syllabus includes the following:—October 29th, Mr. T. H. Armstrong (British Uralite Co.) on "The Arts and Sciences as applied to Building Work"; November 26th, Mr. Owen Fleming on "John Ruskin"; January 28th, Mr. W. T. W. Castell on "Quantities and Measurements"; February 25th, Mr. F. M. H. Jones on "Slag Wool or Silicate Cotton"; and March 25th, Mr. Frank Jay on "Concrete."

These meetings will be held at Memorial Hall, Farringdon Street, E.C. Mr. B. T. Price is the president of the Association and Mr. R. N. Taylor the vice-president.

Cardiff Building Trade: Reduction in Wages Demanded.—After a long peace, extending over several years, there is a

possibility of a break occurring between the Cardiff master-builders and their employees. On November 1st the masters gave the men six months' notice to terminate the present agreement regulating wages, working hours, &c. They desire a reduction of ½d. per hour and that the men should start at 7.30 during the dark months instead of 7, and have only half an hour instead of an hour for dinner. Whether or not the men will accept these terms cannot at present be stated. Much will probably depend on the state of the building trade next May, when the notice expires.

Cheap Cottages and the By-Laws.—Mr. Walter Long will receive a deputation in regard to this matter to-morrow, November 17th, at 4 p.m., at the Local Government Board offices. All who have found the stringency of local by-laws to interfere with rural building should communicate with Sir William Grantham, at 100, Eaton Square, W. —Readers will have noticed that considerable correspondence on this subject has been going on in the "Daily Mail"; in the issue for November 9th an article appeared by the Editor of this Journal.

Seven-hours Day in the Hull Building Trade.—In view of the serious depression in the building trade at Hull, and having regard to the mayor's suggestion that corporations and other public bodies would be greatly assisted in distributing the labour necessary for building purposes by reducing the daily working time in order to give employment to a greater number of workmen, the Hull branch of the Yorkshire Federation of Building Trade Employers has reduced the working hours of labour to seven per day.



CHURCH, MUSWELL HILL, LONDON N. P. MORLEY HDRER, ARCHITECT.

ARCHITECTURAL ASSOCIATION.

Mr. HENMAN ON VENTILATION.

A MEETING of the Architectural Association was held at 18, Tufton Street, Westminster, on Friday evening, Mr. E. Guy Dawber presiding.

The following additional donations to the Building Fund were announced:—

W. H. Lever -	£ s.	W. L. Grant -	£ s.
Owen Fleming -	21 0	Percy L. Marks -	2 2
William Willett -	10 10	George Frampton,	2 2
E. Dru Drury -	5 5	R.A. -	1 1
Leslie W. Green -	3 3	C. L. Hampton -	1 1
A. H. Ryan Tenison -	3 3	George Hubbard -	1 1
F. W. Bedford -	2 2	Arthur Keen -	1 1
H. Farquharson -	2 2		

Votes of condolence with the relatives of Professor Kerr (who was one of the founders of the Association, and became its first president in 1847) and Mr. B. T. Batsford were passed, after which hearty congratulations were accorded to Sir Aston Webb on his knighthood.

The following donations to the Library were announced:—

"Architektonische Rundschau" (nine volumes).
"Blätter für Kunsthandwerk" (three volumes). Presented by Mr. Edwin O. Sachs.

The following were elected members:—Messrs. S. J. Webber (Maidenhead), J. C. Kent (Hailsham), G. G. Rogers (East Sheen), B. Winship (London), J. A. Quittenton (Warrington), P. B. W. Sich (Chiswick), W. A. Napier (London), A. Turmeau (Bow), H. E. Chick (Tulse Hill), R. W. Thorp (Hampstead), A. J. Thomas (London), F. Woods (Maidenhead), T. F. W. Grant (Sittingbourne), V. C. Batalha-Reis (Notting Hill), H. F. Bateman (Harmondsworth), A. H. Boss (London), F. W. Hipkins (London), F. H. Crawley Boevey (London), E. A. Boyle (Westminster), W. A. Aickman (London) and J. L. G. Dahl (London).

Mr. William Henman, F.R.I.B.A., then read a paper on Ventilation.

He said that, like politics and religion, the subject of ventilation was apt to arouse passion and prejudice, which fact had recently been so unpleasantly forced upon him that he had seriously to consider whether he



HOUSE AT HANWELL.

could venture to face another audience and run the risk of exciting animosity in again dealing publicly with the subject. To have withdrawn, however, might have given the impression that he had not the courage of his convictions. So, trusting in the good nature and reasonable spirit of his hearers, he decided to brave the occasion, simply premising that it would be his endeavour not so much to raise controversy as to stimulate observation.

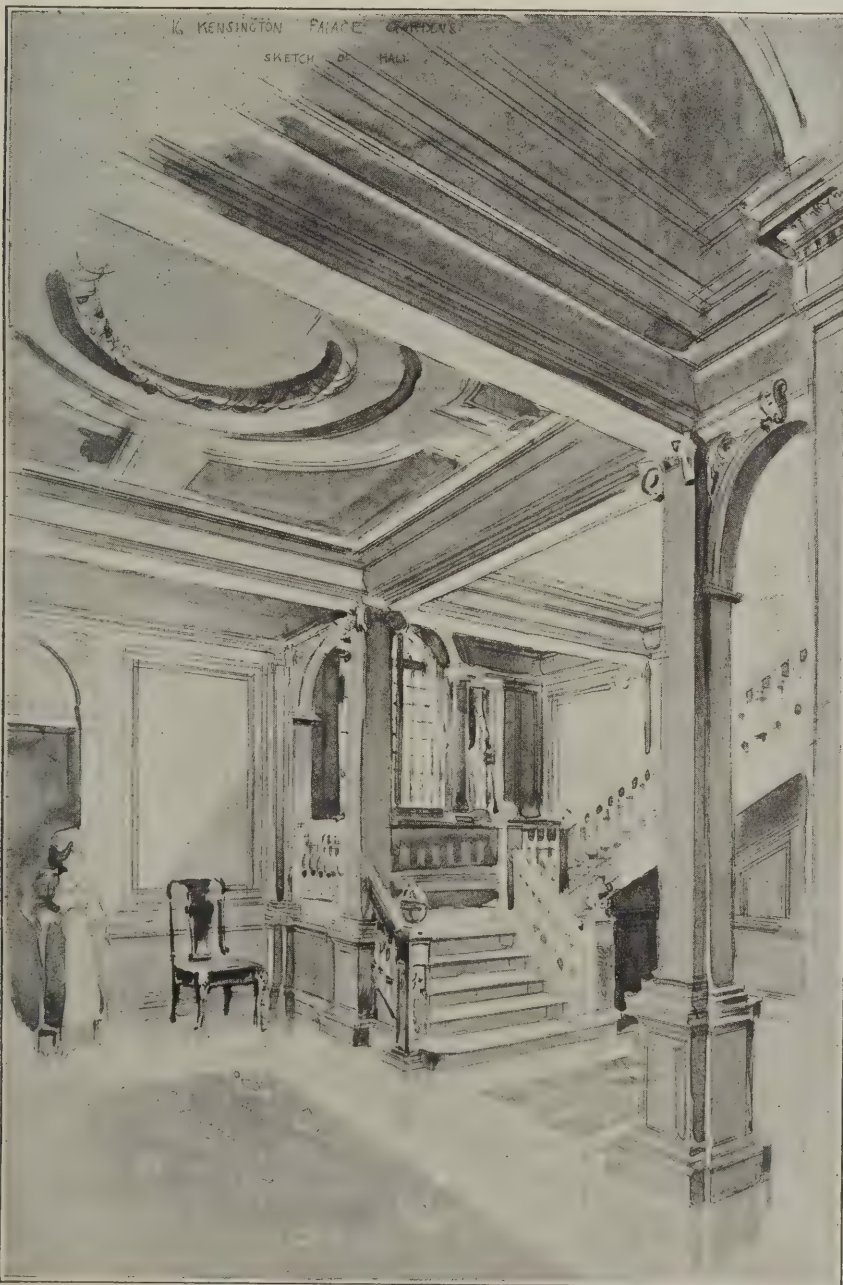
Literature on the Subject.

Literature on ventilation was somewhat profuse, and many eminent scientists had investigated various phases of the subject, yet it appeared to him there was still an opening for a concise treatise dealing with it in a scientifically practical manner, without prejudice, to serve as a text-book for architectural students. Under limitations imposed upon him by the editor, he wrote an article three or four years ago for "Modern House Construction," which, in some respects, dealt with details. It would be tedious to repeat it in an evening's paper, although in substance he had now to give the same conclusions as those dealt with in that article and drawn from his own practical experience.

Perhaps the most unfortunate circumstance in connection with ventilation resulted from the fact that eminent early writers thereon, whose works were still largely resorted to, made assertions from their undoubtedly careful observations which, in face of more modern practice and the great improvements which had since been effected in appliances, could not now be accepted.

One of the best standard works was that by Dr. D. B. Reid, who for some years superintended the ventilation of the Houses of Parliament. He published in 1844 a book entitled "Illustrations of Ventilation." His observations and general statements were generally trustworthy, but his deductions were sometimes at fault.

A more modern book was that of Dr. J. S. Billings, of the Johns Hopkins' Hospital fame, entitled "Ventilation and Heating." It brought together a vast mass of useful information, but being written by an American principally for use in America a considerable portion of its contents was unsuitable for this country, and a careful perusal of the volume left on his mind a sense of indefiniteness, examples being given of so many different methods without clearly indicating those that were worthy of adoption or those that should be avoided. There were numerous other writers on different phases of the subject, but the two mentioned were, so far as he knew, the only books in English which dealt with it exhaustively. Yet there was in both a lack of that practical guidance based on modern experience such as architects now required. The result had been to engender a chaotic state of mind in the profession. Some were inclined to dogmatize upon the



HALL, 16, KENSINGTON PALACE GARDENS, W.

P. MORLEY HORDER F.R.I.B.A., ARCHITECT.

simplicity of this or that method, while others preferred to do nothing. Nevertheless there were certain well-recognized facts which ought to be known by all and intelligently made use of.

Unless air was reasonably pure outside a building it was scarcely possible to have it pure within. Air might be screened and washed, but it was questionable if any means had yet been devised by which, in its passage from without to within a building, a thoroughly impure atmosphere could be made wholesome.

Movement.

Movement above all things was necessary for maintaining a healthy atmospheric condition. Consequently, the first consideration in respect to securing ventilation within a building was, How could the required movement be brought about? Except the property of diffusion common to all gases, air

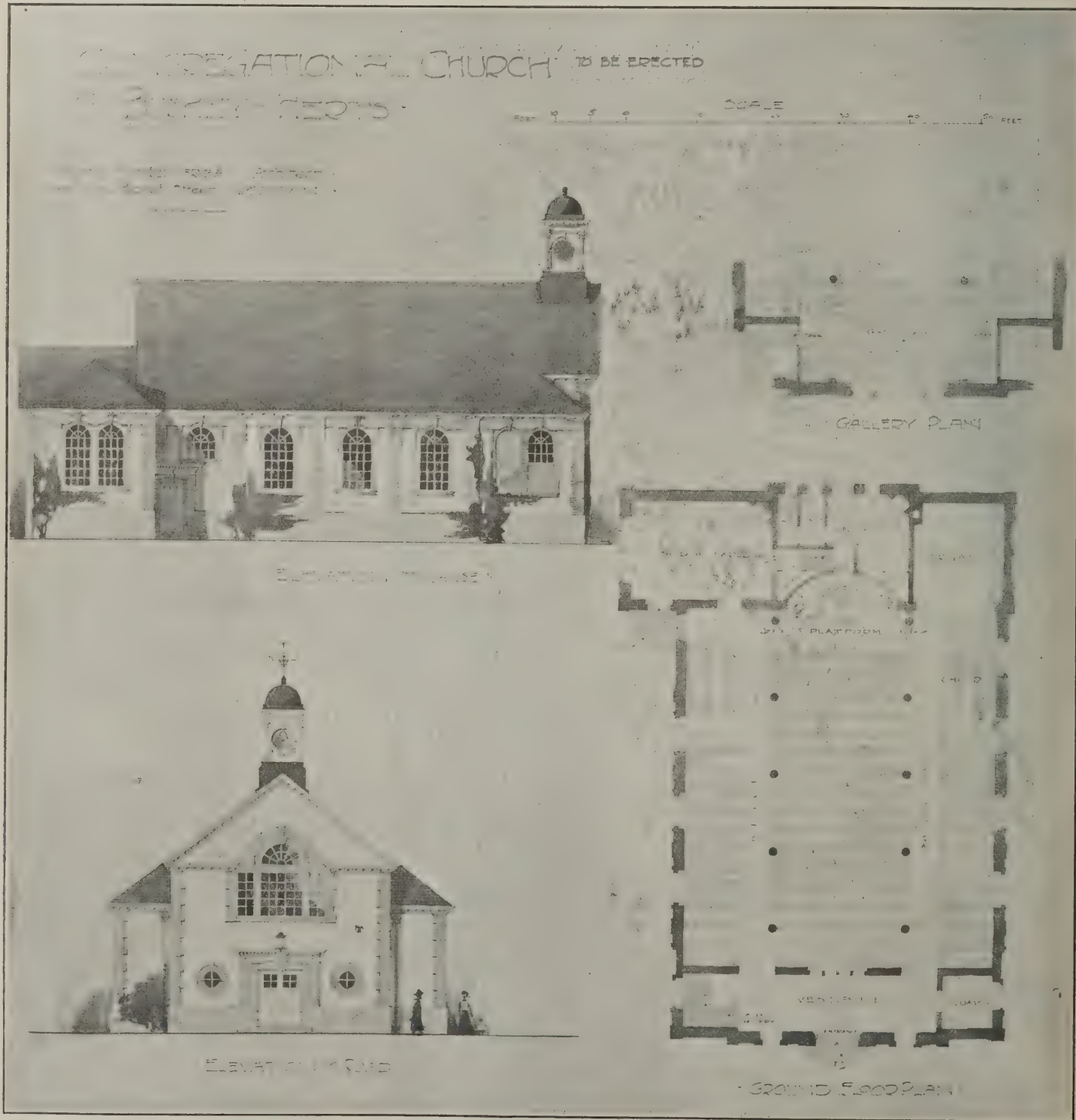
had no inherent power of movement. Some power had therefore to be brought to bear upon it. The most potent natural power was wind; yet wind was only the result of varying temperature on large bodies of the atmosphere. When heated air became specifically lighter than an equal volume of cooler air, the latter, falling by the power of gravitation, forced up the warmer, and therefore lighter, air around; consequently it was the power of gravitation which principally caused natural movements of the atmosphere, i.e., winds. It was commonly stated that heat caused air to rise, and many persons inferred that heat caused a suctional influence in a flue, whereas, in truth, it was by propulsion and not by suction that the air of the room became changed when a fire was lighted at the base of a flue.

Whether the lighting of a fire resulted in the development of a natural, artificial or

mechanical power was not very material; the important fact was that it did develop a power, and an open fire was most useful, not only because it gave comfort by the heat it evolved, but because the power developed might be usefully employed to assist in securing ventilation.

Upward and Downward Ventilation.

Those who had followed the subject knew what controversy there had been on the question of upward and downward ventilation. All would probably agree in condemning actual down-draught; but what was draught? Why, simply an excessive movement of the air which caused discomfort. It had been ascertained that at a velocity of 4ft. a second most people would complain of draught, some might at 3ft., few would at 2ft., and not even the most sensitive person was likely to complain of draught when the velocity did not exceed 1ft. per second. The



temperature of the air would naturally have some effect, so it must be assumed to be normal, *i.e.*, about 60 degs. Fahr.

Efficient ventilation of occupied apartments implied the continuous change of air without causing discomfort to or adversely affecting the health of occupants, and after several years observation he could not detect the slightest objection to that change being effected in a downward direction, so long as draughts were avoided.

Because air respired and emanating from our bodies was warm, and being consequently light, it rose, was the argument used by the advocates of what they called upward ventilation, and they termed it Nature's method. But, again, he believed this to be the result of an imperfect appreciation of scientific facts.

Air Inlets and Outlets.

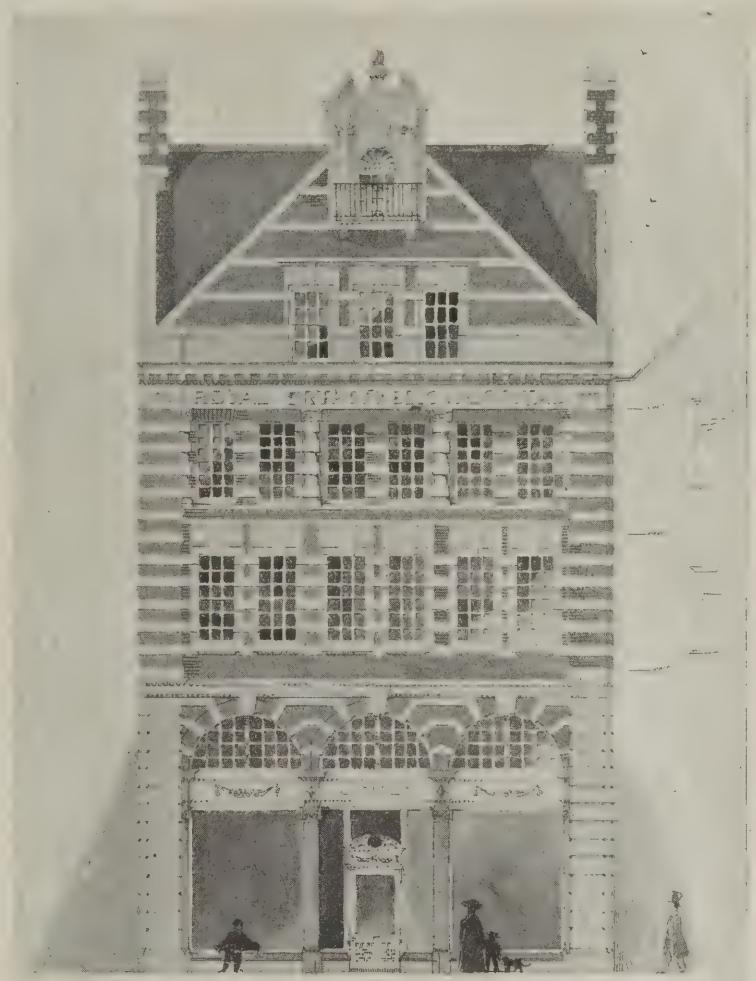
In the act of respiring air was expelled by the contraction of the lungs with considerable force from the mouth and nostrils largely in a downward direction, and the emitted air, being warm and light, was at some distance from where it was emitted forced upwards by cooler and fresher air coming down from above. Consequently, if our ventilating appliances were so arranged as to secure a constant supply of fresh air above the heads of individuals, and to carry off the expired air at a low level, was it not probable that, as occupants more generally occupied the lower portions of a room than the upper part, they were likely to obtain fresher air from the larger volume above their heads than from that below?

To efficiently ventilate a crowded assembly hall from below was practically impossible, because even if fresh air were supplied from below it was bound to pass over the bodies before being breathed; but it had been proved to be quite possible to do so from above.

And if under such adverse circumstances ventilation could best be secured by downward movement, surely it could be attained under more favourable conditions for smaller numbers. In an ordinary room, with an open fireplace, where did we find the outlet opening? Why, within 2ft. to 3ft. of the floor level. Yet anyone could prove for himself that, unless some greater power were exerted, the only outlet for air was by the fireplace flue. This could be proved by simply holding a lighted match or a piece of thin paper before every possible opening.

Where the Inlet should be Placed.

Bearing in mind, then, that efficient ventilation implied comfort for the occupants of a room, the next question was, Where should any special inlet for air be placed? Although it might appear paradoxical, the best way to prevent draughts was really to admit air more freely. If the change of air was too rapid in any room, the only way to prevent it was to reduce the outflow by contracting the sectional area of the outlet flue, because it was the cooler air pressing in on all sides of the room which forced air up that flue. And as with the same pressure only a given quantity of air could be forced through a flue of given section, if that section were reduced in size, a less volume of air would pass through it in a given time. Consequently the velocity with which the air travelled from inlet to outlet would be lessened and draughts in the room might be overcome; but then the question would arise, Was the room being efficiently ventilated? If not, then the outlet flue area must be enlarged and a special inlet provided. So we came back to the question, Where should it be placed? After careful observation and experiment, extending over several years, Mr. Henman said, without hesitation, that it should be on the same side as the fireplace opening, as nearly central thereto as might be, and towards the upper portion of the room (say, about 2ft. below the ceiling).



DESIGN FOR ORTHOPÆDIC HOSPITAL, OXFORD STREET, LONDON.
P. MORLEY HORDER, F.R.I.B.A., ARCHITECT.

By providing louvres or other means for distributing the incoming air throughout the upper portion of the room it would mix with the warmer air rising in front of the fire, spread out, gradually fall and make its way towards the fireplace flue without causing discomfort, because its velocity would be slight, and, coming in contact with the warmed surfaces in the room, its temperature would be raised, while if the fresh air entered freely at the special inlet less air would enter by the casual cracks and crevices. With inlet openings in any other position there would be less diffusion throughout the room, because incoming air would take a shorter and more direct line towards the fire and leave portions of the room less properly ventilated.

Condensation and Evaporation.

Another subject in connection with ventilation to which he had devoted attention was that of condensation and evaporation. As the temperature was raised air became more and more capable of absorbing moisture and was specifically lighter than dry air, at the same temperature. Again, as it cooled by coming in contact with cooler surfaces, moisture was deposited, and becoming specifically heavy, the air fell. By condensation vitiated air might for a time be somewhat purified, but the impurities were deposited upon the cold surfaces with which it came in contact, and unless those surfaces were frequently cleansed the animal matter which was deposited with the moisture putrid in time, the result being that rooms became stuffy where such condensation took place and was not soon removed. The air might be freshened up for a time by opening the windows, but when again closed up, and particularly if a fire were lighted, the stuffiness again became apparent. For this

reason Mr. Henman thought that the most healthy rooms to live in were those of which the walls were not constructed of dense materials which did not retain heat. In fact, he believed that rooms the walls of which were constructed of pervious materials were likely to be the best ventilated, even when no special inlet for air was provided. Such walls took up and retained heat from the fire, they allowed air to pass through them over their whole surface, the air was filtered and took up heat in its passage through, it entered gradually yet in large volume, and kept up a thorough change of atmosphere in the room without perceptible draughts.

Some people thought that the continual passage of air through the walls would in time contaminate them, but with reasonably pure air outside, and exercising its known purifying effect, it was more likely that no deleterious effect upon it would take place, provided always that the walls were kept dry. Wet in the walls would partially close the pores, and probably cause vegetable and animal growth.

Unless ample provision were made for permitting continuous change of air in a room, nothing could be worse than constructing all walls, floors and ceilings of impervious materials, or than covering all surfaces with impervious materials — such as linoleum, lincrusta, paint, &c.

Ventilation of Urinals.

Some places, even with air constantly changing, were never sweet and wholesome. Urinals and the household water-closets, unless all surfaces were kept scrupulously clean, were unwholesome places which might contaminate the atmosphere of a house. Many of these appliances were still badly constructed, particularly in public places.

Generally speaking, at railway stations they were a disgrace. The large surfaces contaminated and infrequently cleansed constantly generated noxious fumes which fouled the air. In public urinals there should be no angles in which deposit could accumulate, open channel ways should be abolished, and each separate urinal should be trapped and provided with a frequent flush of water so directed as to cleanse all surfaces which could be fouled.

Calculations.

Judging from the various schemes for ventilating buildings which had come under his notice, he was surprised to find what little attention was given to even the most elementary calculations as to the probable results which would be attained, notwithstanding that certain data had been arrived at which experience proved to be fairly reliable and so simple that there was no excuse for neglecting to employ them. Failure resulted generally from under-estimating the supply of air necessary for securing efficient ventilation, and from the employment of restricted areas of inlet or outlet channels, openings or ducts.

An ordinary room was provided with one fireplace flue, and, as previously stated, when a fire was lighted that flue was practically the only outlet for air from the room. Consequently, by ascertaining the velocity of air passing up the flue and the sectional area of the flue, it was easy to find how much air would pass through the room in a given time.

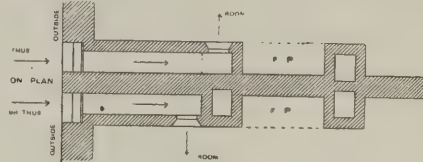
Under medium conditions a flow of about 5 cub. ft. per second might be taken as the volume passing up an ordinary 14 in. by 10 in. flue. He gave the volume at about 5 cub. ft. for the purpose of simplicity, and because it was near enough for practical purposes. If 5 ft. was multiplied by 60 times 60, the result—18,000ft.—would be the volume of air passing through the room in an hour, and if change of air were demanded at the rate of six times per hour, the cubical capacity of a room with only one fireplace flue should not exceed 3,000ft., say 20 ft. by 15 ft. by 10 ft.

A point to which he had given consideration was the size of a special inlet relative to that of an ordinary fireplace flue. A good rule was to have it of ample dimensions, with easy means for its regulation. The difficulty, however, was that people were generally careless in paying attention to so simple an appliance—on a windy day the opening would be closed to prevent discomfort from draughts, and no one thought of opening it in calmer weather. He had, therefore, come to the conclusion that when the inlet was placed as he advised—on the same side as the fireplace and as nearly central thereto as possible, about 2 ft. below the ceiling—a clear opening of about one-half the area of the outlet flue would suffice.

But because of the well-known and frequent variations in the force of wind outside he had devised an automatic regulator, which he exhibited.*

As the accompanying illustration shows, this consists of a metal hopper with curved back, in which a flap is hung on leather hinges so as to prevent any clicking noise.

The flap remains stationary in calm weather, allowing 3½ ins. of space for the air to pass in, but as the force of wind increases, the flap is deflected and the available space thereby reduced proportionately; thus the area of the inlet is automatically contracted and a uniform supply of air secured. The ventilator is made in two parts to suit varying thicknesses of walls, that containing the flap being fixed flush with the outside wall face and the louvred frame flush with the inside, a flue opening being constructed between. Where the chimney-breast is on an inside wall at right-angles to an outside wall, an air duct is formed across the upper part of the recess, thus:—



In determining a system of ventilation the cubical capacity of the building and the total minimum area of the free openings in the appliances should be ascertained, and the time required for the volume of air contained in the building to pass through the openings, say at a velocity of 5 ft. per second; unless the whole volume could pass through in twenty minutes, i.e., at the rate of three changes per hour, efficient ventilation would not be secured for reasonable occupation of the buildings during any considerable length of time. In calculating the amount of change of air required in a building it was safer to take as a basis the cubical contents and number of changes per hour than to take the number of people to be accommodated and allow so many cubic feet of air in a given time for each, because it was important to remember that the building itself had to be ventilated as well as that the occupants required change of air.

For this reason he had come to the conclusion that unless it was considered worth while to continuously ventilate buildings, when mechanical means were provided there was risk of failure, because when the mechanism was stopped change of air ceased, and although when the machinery was restarted change of air might soon be effected the long period of stagnation permitted the materials of and in the building to cool down, condensation took place on all exposed surfaces, and other influences deleterious to the atmosphere of the building might for a considerable time result.

For buildings such as hospitals, which were continuously occupied and throughout which it was important that continuous and ample change of air should take place, together with uniform heating, he thoroughly believed that mechanical means would in time become an absolute necessity.

Extraction or Propulsion.

For some time there was considerable controversy as to whether methods of propulsion or of extraction were to be preferred. He believed that by far the majority of those who had had practical experience in the matter were now most favourable to propulsion. One of the most serious mistakes had been the combination of the two systems, for they could not possibly be economically worked together, and he feared that even if expense were no object, imperfect results could only be secured by employing means for securing extraction as well as propulsion conjointly.

Experience of the 'practical working of well-proportioned installations of plenum ventilation by mechanical means had proved to him that it was possible to secure continuously, at a reasonable expenditure, efficient ventilation such as was quite out of the question when natural means alone were relied on, but in saying that he on no

account undervalued the necessity for taking advantage of the means which Nature placed at our disposal, because he realized that for the majority of buildings anything in the way of mechanism for securing ventilation was out of the question at present, although he ventured to predict that, as time went on and the possibilities of employing mechanism for securing ventilation were more appreciated, an architect's training would not be considered complete unless he made himself fully acquainted with the principles and appliances by which buildings might be successfully ventilated by mechanical means.

Discussion.

Mr. John Murray proposed a vote of thanks, which was seconded by Mr. H. P. G. Maule. Mr. W. J. H. Leverton, Mr. Alfred Burgess, Mr. Needham Wilson and Mr. Dawber also spoke. Mr. Burgess laid stress on the differentiation of the three mechanical systems of ventilation, namely, (1) the plenum system proper, by which air was forced in at a greater pressure than that outside; (2) the extraction system, which put the room under a slight vacuum, and (3) the combination of both systems, air being forced in by a fan at one end and extracted by another fan at the other end, without creating any excess of pressure or a vacuum, for which combined system the name of "equilibrium" was appropriate. Mr. Dawber observed that it having been shown what a quantity of air came through the walls of a room, the jerry-built house with bricks made of mud, and mortar of sawdust, was consequently the most efficiently ventilated!

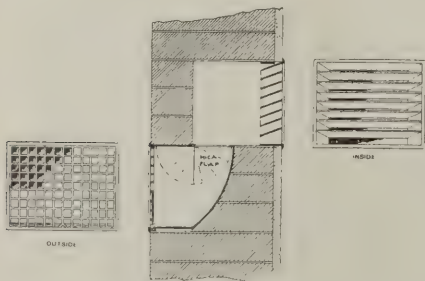
In reply to questions, Mr. Henman said that nearly everybody went back to Dr. Reid, but though he had made very thorough experiments in 1844 many of his deductions were faulty; and it would be found that Mr. Henman was right and Dr. Reid wrong. As to keeping air shafts clean, they should be made of ample size and placed in gettable positions: the matter was then the same as with chimneys: to be efficient they had to be cleaned regularly. Speaking of the perviousness of walls, he mentioned that in an office he formerly occupied the walls were covered with a grained paper thickly varnished, the ceiling painted and the floor covered with linoleum; and the room was always uncomfortable and there was always a draught in it. This would be understood if one considered that with a certain-sized chimney a certain amount of air would be drawn or forced into the room, and in such a room as he had just described the air would come in streams through places where it was not intended to, thus causing draughts. As regards propulsion and extraction, it was the greatest fallacy to suppose the two systems could be combined economically.

The president announced that the next meeting of the Association would be held on November 25th, when a paper by Messrs. J. T. Micklethwaite and E. Prioleau Warren on "Excavations in Westminster" would be read.

Special Elections to Fellowship, R.I.B.A.

—Mr. H. O. Tarbolton and Mr. Cholton James, presidents respectively of the Edinburgh Architectural Association and the Cardiff, South Wales and Monmouthshire Architects' Society, have been elected Fellows of the Institute under the proviso to by-law 9.

District Surveyors' Examination.—Of the eight candidates who presented themselves for this examination on October 20th and 21st, three passed, namely, Mr. P. J. Black, Mr. J. M. Kennard and Mr. John Todd, to whom certificates of competency to practise as district surveyors under the London Building Act have been granted.



* Made by Messrs. Hart, Son, Peard & Co., Ltd., 138-140, Charing Cross Road, W.C.



Front Elevation.



Back Elevation.

0 5 10 15 20 30 40 50 Feet

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

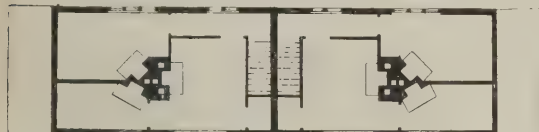
Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Ornament Sheets for R.I.B.A. Examination.

OUTLINE writes: "For the R.I.B.A. intermediate examination, should the sheets of ornament from the round in outline be inked in or finished as pencil drawings? Do you consider two examples each of Early English, Decorated and Perpendicular ornament sufficient for the mediæval sheet?"

As a rule the ornament sheets are left in



pencil, but there are no regulations upon the point. One example only, if a good one filling the entire sheet, is quite enough; but of course it should be done from the original stone carving and not be a copy.

G. A. T. M.

War Office Assistant Surveyor Examination.

BLACKPOOL.—F. R. P. writes: "Which are the best books to study for the War Office assistant surveyor examination?"

This examination is at present in abeyance pending the reorganization of the department and the issue of fresh regulations. Till those are published it is impossible to say what books should be stud ed.

G. A. T. M.

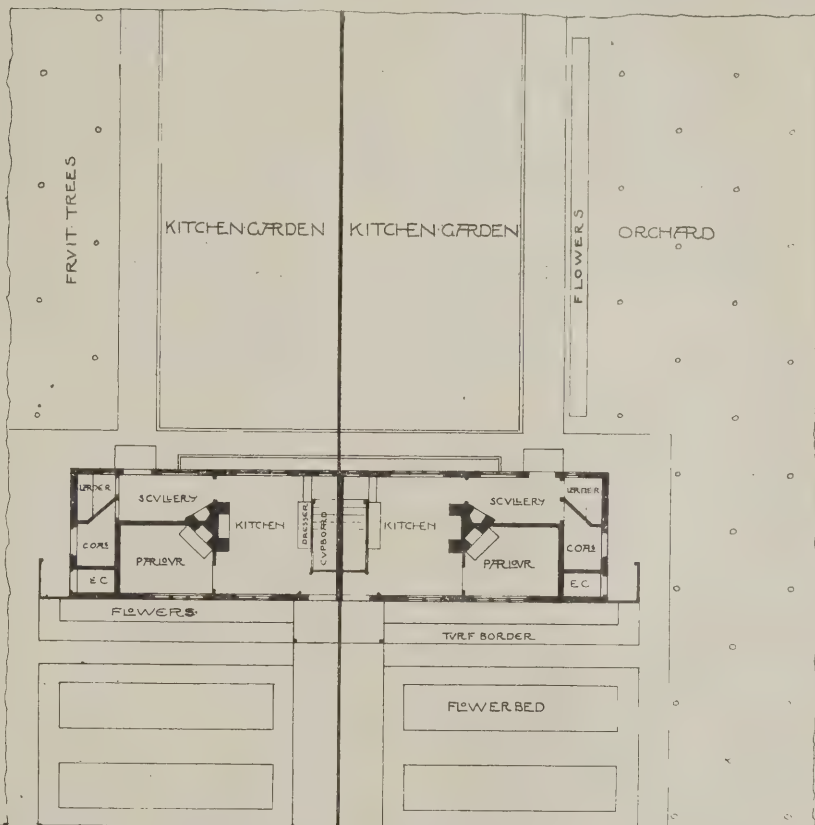
Liability for cost of New Drains.

LONDON.—H. T. B. writes: "A drain running at the back of six houses has been condemned, and the local authorities require new drains put in throughout. Who is liable for the expense? Is each of the six owners equally liable to pay an equal share, or should the owner farthest from the public sewer (No. 6) pay more and the nearest (No. 1) pay less, although all the frontages are the same size? Is this a joint drain or an easement? There is nothing in the lease to define it. Has a similar case been decided in any court?"

As the drain serves more than one building it becomes "a sewer" and as such vests in the sanitary authorities from the point where it for the first time receives the sewage of more than one building—in the present case from where the sewage of No. 5 joins that of No. 6. From that point to its junction with the main in the street it is a public sewer, and must be kept in repair by the sanitary authorities, who, if such be necessary, must at their own expense lay down a new one. The leading case

on this subject is *Travis v. Uttlev*, 1894, 1 Q.B. 233. The only exception to the rule just stated is where the builder of the houses enters into an agreement with the sanitary authorities that in consideration of their allowing him to drain more than one building by a single drain he will admit that thereby it does not lose its character as a drain, and that he is still liable for its up-keep. You should enquire at the office of the local sanitary authority if such an agreement exists, and, if so, you should examine it and see how far it extends. In the present case, No. 6 is a drain within the meaning of the Public Health Act, and its owner must execute the necessary work at his own cost. If by agreement as above mentioned the "drain" still retains its character as a "drain," and if there is nothing to the contrary in the various leases under which the different houses are held, I am of the opinion that each lessee would be equally liable, as each derives an equal amount of benefit from the structure. The law of "drains" and "sewers," considered in conjunction with the Public Health Acts, is treated very exhaustively in an article of mine which appears in the *BUILDERS' JOURNAL* for November 27th, 1901, to which I would refer you for further information.

W. JOHNSON-ROBERTS.



PROPOSED COTTAGES AT SHOTTER MILL, NEAR HASLEMERE. C. F. A. VOYSEY, ARCHITECT.
To be built of brick, cement rough-cast, with deal window frames and iron casements, and red hand-made tile roof.

Safe Load on Cast-Iron Column.

BRADFORD.—RUSKIN writes: "By Gordon's formula, what weight would a cast-iron column 8 ins. external diameter, 1 in. thick, 18 ft. high carry? Kindly show the method of working out a steel stanchion of H section to carry a given weight?"

Gordon's formula is not always stated in exactly the same way. A usual form is

$$P = \frac{fs}{1 + \frac{a}{h^2}}$$

where P = crushing load of a

long rod or pillar in lbs., f = 80,000 ultimate resistance to crushing of a short block in lbs. per sq. in., or about 36 tons, s = sectional

area of material in square inches, $a = \frac{I}{800}$

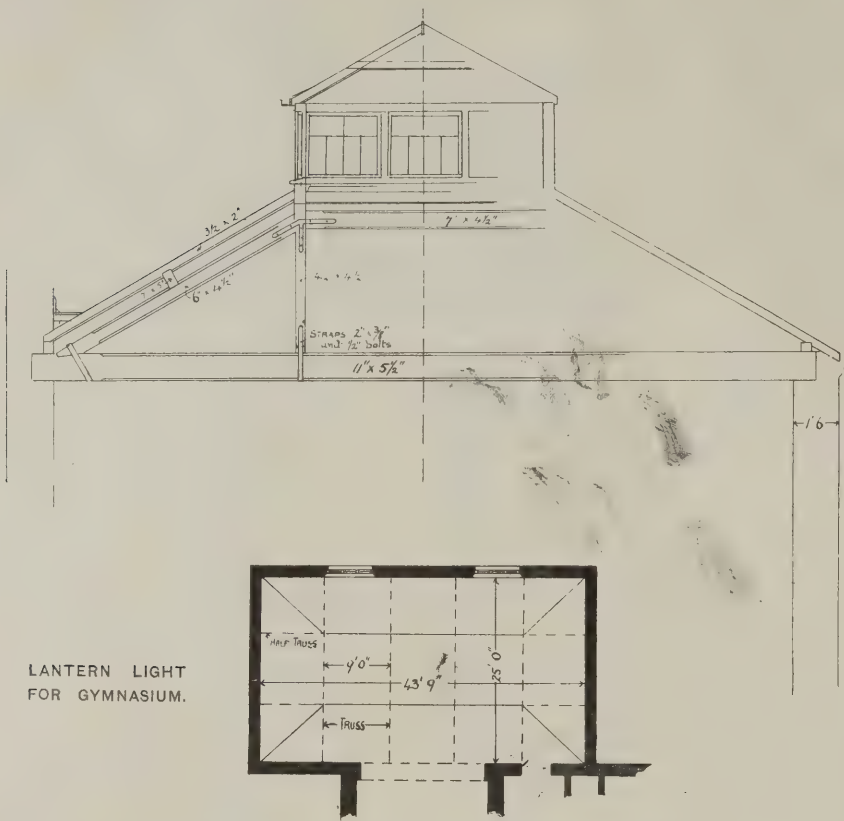
constant deduced from Hodgkinson's experiments, l = length in inches, h = least diameter in inches. By the question, $P =$

$$\frac{36 \times 6 \times 28}{1 + \frac{800 \times (18 \times 12)^2}{8^2}} = \frac{226 \cdot 08}{1 \cdot 91} = 118 \text{ tons; factor}$$

of safety for column 27 diameters long, say,

10; then $\frac{118}{10} = 11 \cdot 8$, say, 12 tons, maximum

safe axial load. The method of working out the section for a built-up steel stanchion takes fifty pages to explain, and it must



LANTERN LIGHT
FOR GYMNASIUM.

therefore be referred to in the original—see "Designing Ironwork," 2nd series, Part II. (Spon, 2s. 6d.).

HENRY ADAMS.

Roof-Trusses for Gymnasium.

ENQUIRER writes: "A small gymnasium has to be built with sufficient roof lighting to allow it to be used at intervals for exhibitions of fine art works. Would a pitch-pine lantern roof with trusses of dimensions shown on accompanying drawing be strong enough to withstand the extra strain put upon it by gymnastic apparatus usually attached to the tie-beam? Is there any drawback to finishing the ceiling surface in lath and plaster—any extra liability to cracking? Is there any advantage or disadvantage in having a wood-block floor in a building of this character? Can you recommend any book upon the subject of gymnasium construction?"

The scantlings shown for roof-trusses will be sufficient, but the queen-post head should be wider to form a proper abutment for principal rafter, and straining beam should be notched in. The weakest part is the foot of the queen-post; another $\frac{1}{2}$ in. on the width of this and on the strap, and $\frac{1}{8}$ in. on the diameter of the bolts, is desirable, making the queen-post $5 \times 4\frac{1}{2}$, the strap $2\frac{1}{2} \times \frac{3}{8}$, and the bolts $\frac{3}{8}$. With the arrangement shown, a lath and plaster ceiling could only be applied directly under the common rafters, and there would be no objection to this if it is preferred to matched lining. A wood-block floor gives more "character" to any hall than a common floor, and as the building is not to be used exclusively as a gymnasium it may be adopted. In the case of a fall a wood block offers more resistance, but proper mats are usually employed wherever a fall may be likely to occur. I do not know of any work on gymnasium construction.

HENRY ADAMS.

Rights of Adjoining Owners.

BIRMINGHAM.—STUDENT writes: "The property of A on accompanying sketch (not reproduced) is threatened by landlord B, who thinks of taking down his houses and building up to the front line. B's houses are very old and have been condemned. A's are about

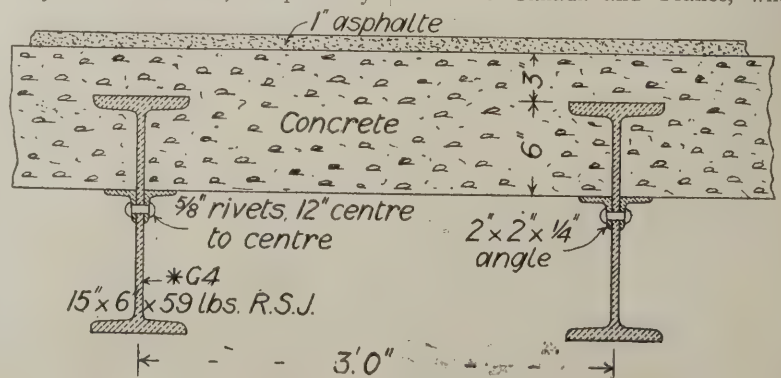
fourteen years old. Has A any power to prevent B from building up to the public way, only 22ft. from A's houses? Can he prevent B from going above a certain height? Is it contained in the angle of 45 degs. from A's ground-floor window-sills? Could A prevent B building a warehouse or workshops which would be a nuisance to A?"

Whether B may build up to the boundary of the public way depends upon whether in doing so his new building will project in front of the recognized frontage line on his own side of the road—that is, if similar regulations regarding frontage line are in force to those which apply in London. If there be no such regulations, he can do as he likes, and in any case A has no right whatever to interfere, as his building has been erected for too short a period for any prescriptive right to have been acquired. M.

Market-Place on Girders and Concrete.

HOLMFIRTH.—A COUNTRY SUBSCRIBER writes: "It is proposed to cover a river so as to provide a market-place for cattle, stalls, &c. The area is 300ft. by 30ft. Would you suggest iron girders and concrete? If so, how many girders and of what strength, and what thickness of concrete? Can you give any idea of the cost? Labour is cheaper here than in a town."

Brick abutments on each side of the river, with rolled joists and concrete, will probably



MARKET PLACE ON GIRDERS AND CONCRETE.

form the best arrangement, leaving the maximum headway over water and occupying the least thickness. The width of 30ft. might perhaps be conveniently reduced to 24ft. or 25ft. by placing the abutments nearer, and this will greatly reduce the total cost, which would vary approximately as the square of the span. Assume 26ft. clear span and an external load of $2\frac{1}{2}$ cwt. per ft. super., or a gross load of 4 cwt. per ft. super. Then if the section adopted for main girders be Dorman, Long & Co.'s (*G 4, 15 x 6 x 59 lb. r.s.j.), the safe load on each will be 16 tons, and with a span of 26ft. and a gross load of 4 cwt. = 0.2 tons per ft. super., the distance

from centre to centre will be $\frac{16}{26 \times 0.2} = \text{say}$

3ft., and the section might be as shown by accompanying sketch. The cost of this superstructure may be about as follows: Ironwork £1,680, cement concrete of 1 cement, 1 sand, 4 large aggregate, £250, asphalt £325, or a total of £2,255. The cost of abutments will depend upon the depth necessary to take them in order to obtain a good foundation, the difficulty or otherwise of placing them alongside the river, the nature of the earth to be supported by the abutment walls, and whether they will be in concrete only or partly brickwork. The cost will probably be not less than £750 to £1,000, making the total cost, allowing for contingencies, somewhere about £3,500; and if the surface is to be laid to falls and drained, this cost may be exceeded. HENRY ADAMS.

The Study of Architecture and Building Construction.

PADSTOW.—H. F. writes: "As I have plenty of time in the winter evenings, I should like to know how to sketch plans of houses. Can you recommend some books that would help me?"

In order to undertake such work a prolonged course of study is necessary. You must first gain knowledge of building construction, and then study architectural history and design, and finally study actual executed works and receive personal instruction in design from an architect. We advise you to start off by reading Ruskin's "Seven Lamps of Architecture," Fletcher's "History of Architecture" and Rivington's "Building Construction."

Action for Negligence against Architect.

Mr. Arthur Martin, of Oxford Street, W., writes in reference to this query in our issue for November 2nd: "You say in effect that a client can sue his architect for damages if he discovers, after paying the final certificate in full, that the builder has evaded the vigilance of the architect and put in work below the standard specified, or perhaps omitted something altogether. In a recent case the judge held that the final certificate released the builder entirely, and so neither the client nor the architect has presumably any case against the builder. Even the most conscientious architect might in this way suffer at the hands of a dishonest builder. Shall we ever get the beneficial system at work in Canada and France, where the

architect and builder are jointly liable for structural defects for ten years, the architect being answerable for defects of his design and specification, and the builder for the shortcomings of his workmen? Such a law would free us simultaneously from incompetent architects and fraudulent builders, giving reality and value to the 'Registration' scheme."

"South African Building News and Contractors' Journal."

BRIGHTON.—C. B. writes: "What is the address of the above journal, referred to in your issue for November 2nd?"

The editor's address is P.O. Box 3311, Johannesburg. The publishers are the Central News Agency, Johannesburg.

Fixative for Pencil Sketches, &c.

LONDON.—C. L. G. writes: "Kindly give a recipe for making fixative for pencil sketches, &c."

There are several kinds of fixatives, but the majority are made of resin dissolved in spirits of wine. For drawings likely to be used roughly a solution of gelatine, made with warm water, in which the drawings are dipped face downwards, is serviceable.

Water Mains.

SETTLE.—X. writes: "Is there any book that explains the method of working out hydraulic gradients and discharges of compound water mains?"

"Water Engineering," by Charles Slagg (7s. 6d. post free from these offices).

Buildings to Measure around Northampton.

NORTHAMPTON.—AJAX writes: "(1) Please name several buildings of Classic and mediæval architecture around Northampton suitable to measure and sketch for the R.I.B.A. intermediate examination; (2) also the names of several books giving the correct method of setting out the five Orders."

(1) See the reply on p. 145 of our issue for March 23rd last. (2) Spiers's "Orders of Architecture" (10s. 6d.) and "The American Vignola," by Prof. W. R. Ware (10s. 6d.), "Mitchell's Classic Architecture" (6s. 6d.). These prices are post free from our offices.

Architect's Claim on Plans Prepared.

FAIRPLAY writes: "Twelve years ago I was employed by a committee to prepare plans, specifications and bills of quantities for a certain block of buildings consisting of church, schools and vestries. The remuneration was to be 5 per cent. commission upon the cost of the work actually executed. Three-fourths of the work was executed and paid for. The execution of the remaining one-fourth was postponed for the time being. Recently, however, the undertakers of the building have arranged to proceed and finish the block. They are apparently using the plans, &c., which I prepared twelve years ago. But they are not employing me in connection with this remaining fourth of the original project; on the contrary they have called in another architect. I claim that I am entitled to be employed to carry out this remaining part of the original project. The undertakers deny this, claiming that they are entitled to employ another architect without regard to me, on the ground, it is suggested, that any rights I may have had under the original contract have now been defeated by the Statute of Limitations. That is to say, inasmuch as more than six years have elapsed since the contract was in any way recognized or acknowledged, therefore the contract is not now enforceable against the undertakers."

Assuming that there are no other facts which affect the case, it is very probable that you would be successful in the action if it were fought out, for the Statute of Limitations does not commence to run until the

cause of action arises. Here the cause of action arose only some months ago, when the undertakers committed a breach of contract (*i.e.*, a breach of the *implied undertaking* to employ you as their architect in regard to these buildings) by employing another architect. The date to have regard to is not the date of the original contract but the date of the breach thereof. Therefore, it follows that the Statute of Limitations will not apply in this case until six years after the date of the breach of contract which has recently occurred. Legally as well as morally, you seem to have a fairly safe case, provided you have stated the facts fully and accurately.

S. M. J. M.

Obituary.

Mr. W. H. Handover, builder, Paddington, died recently from heart failure.

Mr. Thomas Boyce, the well-known London contractor and property owner, died on November 4th at the age of fifty-seven.

Mr. H. R. Gough, F.R.I.B.A., architect, died at his London residence, 35, Shaftesbury Road, Ravenscourt Park, W., on Sunday, November 6th, at the age of sixty-one. After serving his articles he studied in France, Germany, Belgium and Holland. In 1864 he entered the service of the War Office, being subsequently Chief Draughtsman at Woolwich Arsenal. He commenced practice for himself in 1870, and met with a large measure of success, especially in the erection and alteration of churches, his works including St. Cuthbert's Church, Kensington; the parish church of St. Paul, Hammersmith; the Pro-Cathedral at Brisbane; the parish churches at Catford, Kilmarnock, Kippax, &c.; and the cemetery chapel at Colombo. Mr. Gough had also been employed in the restoration of numerous churches, schools and houses, and was responsible for the alteration and decoration of the Army and Navy Club in Pall Mall. He had been a Fellow of the Royal Institute of British Architects since 1879, was president of the Society of Architects in 1885-6, and re-elected for 1886-7. He had also been arbitrator for the London Chamber of Commerce.

The late Mr. B. T. Batsford, whose death we announced in our issue for last week, commenced business in 1843 as a second-hand bookseller at No. 30, High Holborn, whence he moved to No. 52 soon afterwards. At first he concerned himself with books of a general character, but, by reason of the number of architects in the neighbourhood and the proximity of Mr. John Weale, the well-known publisher of architectural and engineering books, he gave special attention to these latter and formed a large collection, issuing catalogues from time to time which soon made him known, both at home and abroad, as "the architectural bookseller." In the early 'sixties he was joined by his eldest son, Mr. Bradley Batsford, and ten years later by his second son (Henry George), who died after eleven years' service, when his third son (Herbert), who with Mr. Bradley Batsford now constitutes the firm, entered the business. The removal to more commodious premises at 94, High Holborn took place in 1893. The numerous well-known books published by Mr. Batsford do not need mention here. It will suffice to add, in concluding this brief notice of a genial personality, that Mr. Batsford retired two years ago, after sixty-eight years of business life. He was eighty-three. In THE BUILDERS' JOURNAL for July 9th, 1895, will be found an article on "The Books of the Batsfords," wherein many interesting anecdotes are given.

DEFECTIVE SCHOOLS.

AT last week's meeting of the London County Council the Education Committee reported that on June 28th, 1904, the Council sanctioned expenditure not exceeding £1,794 for making a survey of the 508 non-provided schools within the county, beginning with those schools which had been unfavourably reported upon by the Council's inspectors. Active steps were being taken to complete this survey, and the form upon which the reports were being made by Mr. T. J. Bailey, F.R.I.B.A., the educational architect, provided for a description of the arrangements existing in regard to (i.) lighting, (ii.) ventilation, (iii.) heating, (iv.) cloak accommodation, (v.) lavatory accommodation, (vi.) teachers' rooms, (vii.) staircase accommodation and emergency exits, (viii.) area of playground. Particulars were also given of the office accommodation and the general condition of the building as regards structural repair, &c., together with the recommendations of Mr. Bailey upon the various points. Up to the present time about 200 schools have been surveyed, and Mr. Bailey reported that his survey would be completed by February, 1905. Detailed recommendations followed, dealing with the under-mentioned twenty-nine schools:—

Battersea—St. Mary's (N.), Green Lane, Battersea.
Battersea—Christ Church (N.), Este Road, Battersea.
Battersea—The Sacred Heart (R.C.), Trott Street, Battersea.
Battersea—St. Peter's (N.), Plough Road, Clapham Junction.
Battersea—Wesleyan Model (Southlands Training College Practising School), Castle Street, Battersea.
Battersea—St. John's (N.), Usk Road, Battersea.
Battersea—St. Mark's (C.E. Infants'), Battersea Rise.
Bethnal Green, S.W.—St. Matthias (N.), Granby Street, Bethnal Green.
Brixton—St. Andrew's (N.), Lingham Street, Stockwell.
Brixton—St. Mark's (N.), Bolton Street, Kennington.
Clapham—Wandsworth Road (Commercial), St. Paul's Place, Wandsworth Road.
Deptford—St. Joseph's (R.C.), High Street, Deptford.
Greenwich—St. Peter's (N.), Bridge Street, Greenwich.
Hampstead—Emmanuel (N.), West End, Hampstead.
Hampstead—St. Mary's (C.E.), West End Lane, Kilburn.
Hampstead—St. Mary's (R.C.), Holly Place, Hampstead.
Hampstead—St. Paul's (P.), Winchester Road.
Lambeth, N.—Lambeth Road (Wesleyan), Lambeth.
Lambeth, N.—St. Mary's (Infants'), Lambeth Road.
Marylebone, E.—St. Edward's Convent (R.C.), Blandford Square.
Marylebone, W.—Richmond Street (R.C.), Edgware Road, St. John's Wood.
Paddington, N.—Harrow Road (R.C.), Paddington.
Paddington, N.—St. Mary's (N.), Church Place, Harrow Road, Paddington Green.
Paddington, N.—St. Mary Magdalene, Clarendon Street.
Poplar—Hale Street (Wesleyan), Poplar.
Poplar—All Saints' (N.), Bow Lane and Newby Place, Poplar.
Walworth—St. Matthew's (N.), Lion Street, New Kent Road.
Walworth—St. John's (N.), Larcom Street, Walworth Road.
Wandsworth—Immanuel (C.F.), Factory Square, Street nam Common

L.C.C. Architects' Department.—The work of repairing and maintaining the Education Offices, including the subsidiary offices taken for the central administrative education work of the London County Council which was under the late School Board executed under the direction of the Educational Architect, having now devolved upon the Superintending Architect, Mr. C. J. Ashton has been promoted to take charge of the work, with three technical officials.

The Gladstone Memorial is to be placed about 50ft. from the railings at the western end of St. Clement Danes Church, in the Strand. It has been designed by Mr. Hamo Thornycroft, R.A., and has a cruciform base, measuring about 25ft. every way, with a pavement 5ft. wide around it. The base will be of Portland stone and the statue of bronze, representing Mr. Gladstone in the robes of the Chancellor of the Exchequer. Seated statues in groups, also in bronze, will be placed on the projecting portions of the base. The total height of the memorial will be about 32ft.

Law Cases.

Mr. Alcott's Appeal Dismissed.—The Court of Appeal recently dismissed the appeal of Mr. Edward Alcott from the judgment of Mr. Justice Grantham in the libel case against Millar's Karri and Jarrah Forests, Ltd., and another. The libel complained of was contained in the following letter (dated May 14th, 1902), written on behalf of the defendant company, and sent to each member of the Marylebone Borough Council at a time when the plaintiff had submitted a tender for paving Oxford Street with wood: "We understand that your council propose laying the roadway of Oxford Street with American red gum blocks. We would very strongly recommend that, before deciding upon this, you should pay a visit of inspection to Piccadilly, Waterloo Place, Haymarket and Whitehall, the roadways of which have been paved with American red gum only from six to eighteen months, and are now in a rotten condition. We venture to say that the result of such a visit would certainly remove from your mind any idea of using such material for roadways in your district."

FEVER HOSPITALS.

AT the recent meeting of the Royal Sanitary Institute at Southampton, Dr. Lauder, medical officer of health for the town, read a paper on "Fever Hospitals." He pointed out that although general hospitals had advanced with the times to meet the demands of science, infectious fever hospitals had not. The more efficient hospitals formerly provided by sanitary authorities to meet the wants of their districts consisted of (1) an administrative block; (2) at least four wards, in two separate pairs, in which patients of both sexes, suffering from two different infectious fevers, could be simultaneously treated; (3) certain outbuildings, such as washhouse, mortuary, &c.: and to-day the hospital for infectious fevers was practically the same, with the addition of receiving and observation rooms and discharge block. Every patient should be kept isolated; he should be admitted through a receiving-room, where he should be purified as much as possible by change of clothes, bathing, &c.; he should be removed from the receiving-room to a specially-prepared room where he should be treated until convalescent—each patient

being allotted a separate room; and he should then be disinfected as much as possible.

Correspondence.

Mortuary Fittings.

To the Editor of THE BUILDERS' JOURNAL.

EPSOM.

SIR,—Having recently noticed in your Journal an article on mortuaries, &c., I desire to inform you that a post-mortem room has been completed here to my designs, and that Messrs. Lockerbie & Wilkinson, of Tipton, have therein fitted overhead travelling gear connecting the cubicles with the post-mortem table.—Yours truly,

EDWARD R. CAPON,
Town Surveyor.

A fifth edition of "A History of Architecture on the Comparative Method," by the late Prof. Banister Fletcher and Mr. Banister F. Fletcher, F.R.I.B.A., will be published by Mr. B. T. Batsford this month. This edition has been rewritten and considerably enlarged by the junior author. It will contain upwards of 800 pages, with 2,000 illustrations.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Nov. 17	East Ardsley, Yorks—Erection of Store	Morley Industrial Co-operative Society.	R. Castle & Son, London City and Midland Bank Chambers, Cleckheaton.
" 17	Kendal—Stables, &c.	J. W. Fothergill	J. Bintley, 7 Lowther Street, Kendal.
" 17	Croydon—Completion of Offices	Town Council	G. F. Carter, Town Hall, Croydon.
" 17	Kedham, Essex—Alterations, &c., to Schools	Managers	National School, Dedham.
" 18	Keedy, co. Armagh—Premises	Northern Banking Company ...	W. H. Stevens & Sons, Donegal Square North, Belfast.
" 18	Uzon, near Montrose—Coastguard Buildings	—	Superintending Engineer, H.M. Naval Establishment, Rosyth, Inverkeithing, N.B.
" 18	Frieston, Lincs—Coastguard Buildings	—	Director of Works Department, Admiralty, 21 Northumberland Avenue, W.C.
" 18	Grancha, Ireland—Four Houses... ..	Management of Londonderry District Lunatic Asylum.	M. A. Robinson, Richmond Street, Londonderry.
" 18	Leek—Post Office	Commissioners of H.M. Works, &c.	Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W.
" 19	Melburn—Parish Institute... ..	—	Watson & Son, St. Andrew's Chambers, Penrith.
" 19	East Stonehouse, Devon—Alterations to Hotel	—	H. J. Snell, 11 The Crescent, Plymouth.
" 19	St. Albans—Alterations to Police Station	County Council	County Surveyor's Office, Hatfield.
" 21	Bradford—Tramcar Depot	Corporation... ..	F. E. P. Edwards, Brewery Street, Bradford.
" 21	Carnarvon—School Building	Local Governing Board	G. A. Humphreys, Architect, Llandudno.
" 21	Mitcham, Surrey—Relief Station, &c.	Guardians	Chart, Sons & Reading, Union Bank Chambers, Croydon.
" 21	Solihull—Public Offices, &c.	Rural District Council	A. Q. Curral, The Square, Solihull.
" 21	Croydon—Relief Station	Guardians	Chart, Sons & Reading, Union Bank Chambers, Reading.
" 22	Swansea—Houses	Harbour Trustees... ..	J. Thomas, 32 Fisher Street, Swansea.
" 23	Lambeth—Kitchen	Guardians	W. Thurnall, Guardians Offices, Brook Street, Kennington Road, S.E.
" 24	Acton—School	Urban District Council	E. C. P. & H. Monson, Grosvenor House, Acton Vale, W.
" 24	Bradford—Printing Works and Shops	—	A. Sharp, Pearl Assurance Buildings, Market Street, Bradford.
" 25	Crawfordsburn—House	Colonel Sharman Crawford ...	S. G. Hunter, Scottish Provident Buildings.
" 25	Alnwick—Infirmary... ..	Governors	W. T. Hindmarsh, 26 Bondgate Without, Alnwick.
" 25	Ingoldmells, Lincs—Coastguard Buildings	—	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
" 25	Lowestoft—Reserve Establishment	—	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
" 25	Nelson, Lancs—Fish, &c., Market	Market and Library Committee	Mr. Ball, Borough Surveyor, Nelson.
" 25	Peel, Isle of Man—Coastguard Buildings	—	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
" 25	Rotherham—Wall	Sewerage Works Committee ...	Borough Surveyor, Rotherham.
" 25	St. Peters, Lincs—Coastguard Buildings	—	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
" 26	Burnham Market, Norfolk—Improvement to Offices	Education Committee	Rev. E. Kynaston, Burnham Market.
" 28	Newcastle-on-Tyne—Schools	Governors	H. J. Criddle, Northern Assurance Buildings, 2 Collingwood Street, Newcastle.
Dec. 5	Edinburgh—City Hall	Corporation... ..	Public Works Offices, City Chambers, Edinburgh.
" 7	East Cowes—Engine House	Urban District Council	A. Damant, Council Offices, Cowes.
" 20	Lambeth—Conversion of School into Home	Guardians	W. Thurnall, Clerk, Guardians' Offices, Brook Street, Kennington Road, S.E.
No date	Felixstowe—Coach House... ..	W. G. Clarke	H. W. Buxton, 26 Hamilton Road, Felixstowe.
"	Leeds—Premises	—	Jowett Kendall & Sons, 10 East Parade, Leeds.
ENGINEERING:			
Nov. 17	Henstridge, Somerset—Cast-iron Mains	—	Mr. Gunningham, Henstridge.
" 18	Belfast—Electrification of Tramways, &c.	Council	S. Black, Town Clerk, Belfast.
" 18	Thatcham—Two Steel Bridges	Berkshire County Council	J. Morris, Broadway Buildings, Reading.
" 19	Dewsbury—Steam Boiler	Joint Hospital Board	Haltom & Fox, Corporation Street, Dewsbury.
" 19	Birmingham—Public Baths	Urban District Council	J. P. Osborne, 95 Colmore Row, Birmingham.
" 21	Rotherham—Wiring... ..	Corporation... ..	Borough Electrical Engineer, Rawmarsh Road, Rotherham.
" 22	Manchester—Cranes	Tramways Committee	J. M. McElroy, Tramways Department, 55 Piccadilly, Manchester.
" 22	Winslow—Gas Fittings	Gas Committee	W. Severs, Gasworks, Winslow.
" 23	Edinburgh—Ironwork	Water Trustees	Public Works Office, Edinburgh.
" 24	Ashford, Middlesex—Lining Water Tanks	Managers of W. London School District.	F. G. Beeching, Clerk to Managers, Ashford.
" 26	Glasgow—Electric Lighting	Governors of West of Scotland Technical College.	F. H. Stockdale, 38 Bath Street, Glasgow.
" 27	Dundee—Covering for Pipes	Harbour Trustees	J. Thompson, Harbour Engineer, Dundee.
" 28	Sunderland—Generators	Corporation... ..	John F. C. Snell, M.I.C.E., Town Hall, Sunderland.
" 28	Walthamstow—Heating	Urban District Council	G. W. Holmes, A.M.I.C.E., Town Hall, Walthamstow.
" 28	London, E.C.—Steam Motors	—	Offices, Threadneedle House, Bishopsgate Street Within, E.C.
" 29	London, N.—Laundry Machinery	Hornsey Town Council	E. J. Lovegrove, Borough Engineer, Municipal Offices, 99 Southwood Lane, Highgate, N.
Dec. 1	London, E.C.—Steam Motor	Agent-General for S. Australia	Offices, Threadneedle Street, E.C.
" 3	Oswestry—Motor Vehicles	Cambrian Railways Co.	E. H. Jones, Locomotive Superintendent, Oswestry.
" 3	Brentwood—Pump	Essex County Asylum	Medical Superintendent, Brentwood Asylum.
" 5	Edinburgh—Heating and Ventilation	Corporation	Public Works Office, City Chambers, Edinburgh.
" 7	Johannesburg—Cranes	Municipal Council	Mawdey and Dawbarn, 82 Victoria Street, S.W.

Trade and Craft.

Seasoning Timber.

A demonstration of the Powell process of seasoning timber was recently given at the works in Carpenter's Road, Stratford, E. This process is a novel one, and has already been referred to in these columns. It was invented by Mr. William Powell, and consists briefly in impregnating the timber with sugar. No chemicals or minerals are used, and neither pressure nor vacuum is required to induce absorption in the timber, because, as was discovered by Dr. Titherley, wood is so greedy of saccharine that when boiled in a sugar solution it yields its air three times as rapidly as when boiled in water alone. By the Powell process the spaces in the timber occupied by air are filled with sugar. It is particularly noteworthy that the newer the timber the better it is for the purpose of processing; instead of extracting the sap, the process makes use of all the vital juices of the timber, augmenting instead of reducing every valuable quality. Timber felled in the forest may be made ready for commercial use within a fortnight, and is not only seasoned, but is made stronger, firmer, tougher, less porous (thereby diminishing its tendency to shrink, expand, warp or twist), and more durable than in its natural state, whether seasoned naturally or artificially. Dry rot and the penetration of disease germs are prevented. The plant required is simple, and the process is not costly. For the commoner woods sugar molasses (a cheap material) can be used, while for better class woods raw beet sugar (also comparatively cheap) is preferable. The process is as follows:—The timber is first laid upon trucks and so packed that the saccharine solution may have free access to each piece. The trucks are then run to a trolley, which carries them from the loading stage to the process cylinder and from there, after processing, to the drying rooms. The process cylinder at present in use is 30ft. long and 6ft. 6ins. in diameter, and the front is fitted with a massive iron door raised by pulleys. The loaded trucks are run into the cylinder on rails, and are fastened down in order to prevent the timber from floating in the solution. When the cylinder is charged the door is hermetically sealed by strong clamps. The interior of the cylinder is surrounded with closed pipes, answering the double purpose of heating the solution by steam and afterwards cooling it by water. Although the present cylinder is sufficient for its purpose, experience already shows that an open tank may be substituted with advantage as regards economy in working and the first cost of the plant. Suitable storage tanks are provided for holding various qualities of liquor, corresponding with the class of timber to be processed. Connecting these tanks with the cylinder are a series of pipes with valves, and two centrifugal pumps are employed for dealing with the syrup and circulating cold water. On a line with the front of the cylinder are the drying chambers, heated by a Blackman's stove, from which the air is forced by a 48in. fan, through the ducts leading into the chambers. Each chamber has a 36in. circulating fan, and can be heated or cooled independently. One chamber was heated to about 123 degs. Fahr., another to 160 degs. Fahr., and the third to 218 degs. A 35-h.p. horizontal engine supplies the necessary power to drive the pumps, fans, &c., and a Lancashire boiler supplies the required steam for both engine and process cylinder. The timber is first boiled in a compound saccharine solution, whereby the latent air is driven out and the albumen of the sap coagulated. The timber is then allowed to cool in the solution until it is sufficiently impregnated, and finally it is dried at a high temperature.

Sugar is far more natural to use in connection with timber than the substances usually sought for preservation and fire-proofing purposes, because it belongs to the same series of organic compounds, the carbohydrates, as cellulose or lignin, the chief constituent of the cells of plants; sugar and starch are found in the cells of most plants.

Some of the commoner woods are so much altered in texture by the process as to take their place amongst the more expensive timbers. Natural common spruce, for instance, is soft and porous, and can only be used for the commonest purposes, whereas Powellite spruce will take a high polish and has even a decorative appearance, the surface, when planed, being like silk. Moreover, the spruce will no longer swell or contract, and is from 25 to 50 per cent. stronger than in its ordinarily seasoned state. The wood is easily treated by the Powell process, whereas even under high pressure it is difficult to creosote, and cannot be readily creosoted when wet and sappy, yet this is an advantage with the Powell process. Hard woods can be easily treated also. For structural purposes the process promises great advantages. Powellized wood bears a greater strain at a higher deflection than natural wood, and its crushing strength is increased, while for joinery and cabinet work the avoidance of shrinkage and warping is remarkable. A test was made on two panels of yellow pine and two of West African mahogany, two treated and two not, and cut from the same planks; these were placed side by side in the drying room for five days, with the result that the processed pane's had no flaw or crack, whereas the untreated ones looked as if taken from a jerry-built house after it had been rented for a year or two, the moulding being warped and giving way, and the side pieces of the panels rapidly parting. Moisture has little or no effect on treated timber, strange as it may seem; it is true some sugar can be boiled out after some hours, but this of course is impossible in practice. The advantages of being able to season wood quickly are apparent. If a sawmill and processing plant were erected on the fringe of a forest the newly-felled timber could be converted into merchantable sizes of perfectly seasoned timber, of a higher quality than ordinarily could be obtained, ready for shipment within a week or two of felling. The address of the Powell Wood-Process Syndicate, Ltd., is Temple Bar House, 28, Fleet Street, London, E.C.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported that they saw no objection to the following applications under the London Building Act being acceded to:—

Houses with one-storey shops in front of site of 63, Dartmouth Road, Forest Hill, and additional storeys over existing shops to 55 and 55A, Dartmouth Road, Lewisham, submitted by Mr. E. C. Christmas.

Two projecting porches to a proposed factory on site of 61 to 71, Collier Street, Pentonville, Finsbury, submitted by Mr. S. D. T. Pettit on behalf of Messrs. Everett & Co.

Projecting porches with balconies over and bargeboards at 41 to 79, Finlay Street, Fulham, submitted by Mr. A. Dawkins on behalf of R. B. Mason.

Wood, iron and glass porch at workhouse, Sidney Road, Homerton, submitted by Mr. F. R. Coles on behalf of Hackney Union Guardians.

House corner of St. Edmund's Terrace and Avenue Road, St. Marylebone, submitted by Mr. A. F. Faulkner on behalf of Mr. W. Willett.

Projecting porches at Primitive Methodist Chapel, Manchester Road, Cubitt Town, Poplar, submitted by Mr. H. Harper.

One-storey shops in front of 98, 100 and 102, Lower Richmond Road, Putney, submitted by Mr. J. Durham on behalf of Mr. A. Welham.

Projecting porch steps and angle turret at Hopkinson House, Vauxhall Bridge Road, Westminster, submitted by Mr. R. S. Ayling on behalf of the Brabazon House Co.

Re-erection of buildings on western side of Cross Key Court, London Wall, City, submitted by Mr. A. Griffin on behalf of Mr. G. J. Mathieson.

Additions to "The Whins," North End Road, Hampstead, submitted by Messrs. Grayson & Ould on behalf of Mr. W. H. Lever.

Scullery and entrance hall addition, projecting steps and hood, 22, Hill Road, St. John's Wood, submitted by Mr. S. A. Tatchell on behalf of Mr. E. A. Benjamin.

Two-storey building on site of 108, Broadwall, Southwark, submitted by Messrs. J. Hoare & Son on behalf of Mrs. A. Hoare.

Club Rooms, "The Cedars," Clergy House, High Street, Battersea, submitted by Mr. J. S. Quilter on behalf of Canon J. Erskine Clarke.

Cartshed with four storeys over, on east side of Gravel Lane, Southwark, submitted by Mr. E. Carritt on behalf of Mr. J. Sainsbury.

Additions to engine-room at electric-light stations, Globe Lane, Woolwich, submitted by Mr. F. Sumner on behalf of Woolwich Borough Council.

Building on north side of High Street, Kensington, at corner of Brown's Buildings, submitted by Mr. P. E. Pilditch.

Workmen's dwelling houses on a site to northward of Rotherhithe Tunnel approach, between Rose Lane and Butchers Row, submitted by Mr. R. Robertson.

FAIENCE AND MOSAIC AT ST. LOUIS.

Messrs. Minton Hollins & Co., of Stoke-on-Trent, are to be congratulated upon having been awarded a gold medal for their exhibit of tiles, faience and mosaic at the St. Louis Exhibition. The principal feature of this exhibit is a large drinking fountain carried out in faience in a Byzantine style. It is 7ft. 6ins. high, 9ft. 6ins. long, and stands on a rich jasper encaustic floor made on the original Minton method. The wall of the fountain is laid with turquoise glazed mosaics, the water flowing from two modelled masks set in an ebony coloured wall. The corner pillars, base and top are treated in greens. A striking feature of the exhibit is a framed panel designed and executed by Mr. Gordon Forsyth, the art director of the firm. The main feature of the decoration is a life-size figure of St. Louis, accoutred for the Crusades, carried out in cloisonné glazes, standing in a modern faience frame. Another exhibit which has attracted great attention is an encaustic flooring for a room in blue and gold, made up of 8in. tiles.

The North British Station Hotel, Glasgow, is to be ventilated with electric fans supplied by Messrs. Matthews & Yates, of Cyclone Works, Swinton, Manchester, who have also supplied the fans for the company's hotel at Edinburgh. They have also just completed the erection of a humidifying and ventilating apparatus at Messrs. A. Barlow & Sons' Union Mill, Hackley, near Manchester, which is giving excellent results both as regards the required amount of humidity and in keeping the CO₂ below the limit allowed by the Home Office.

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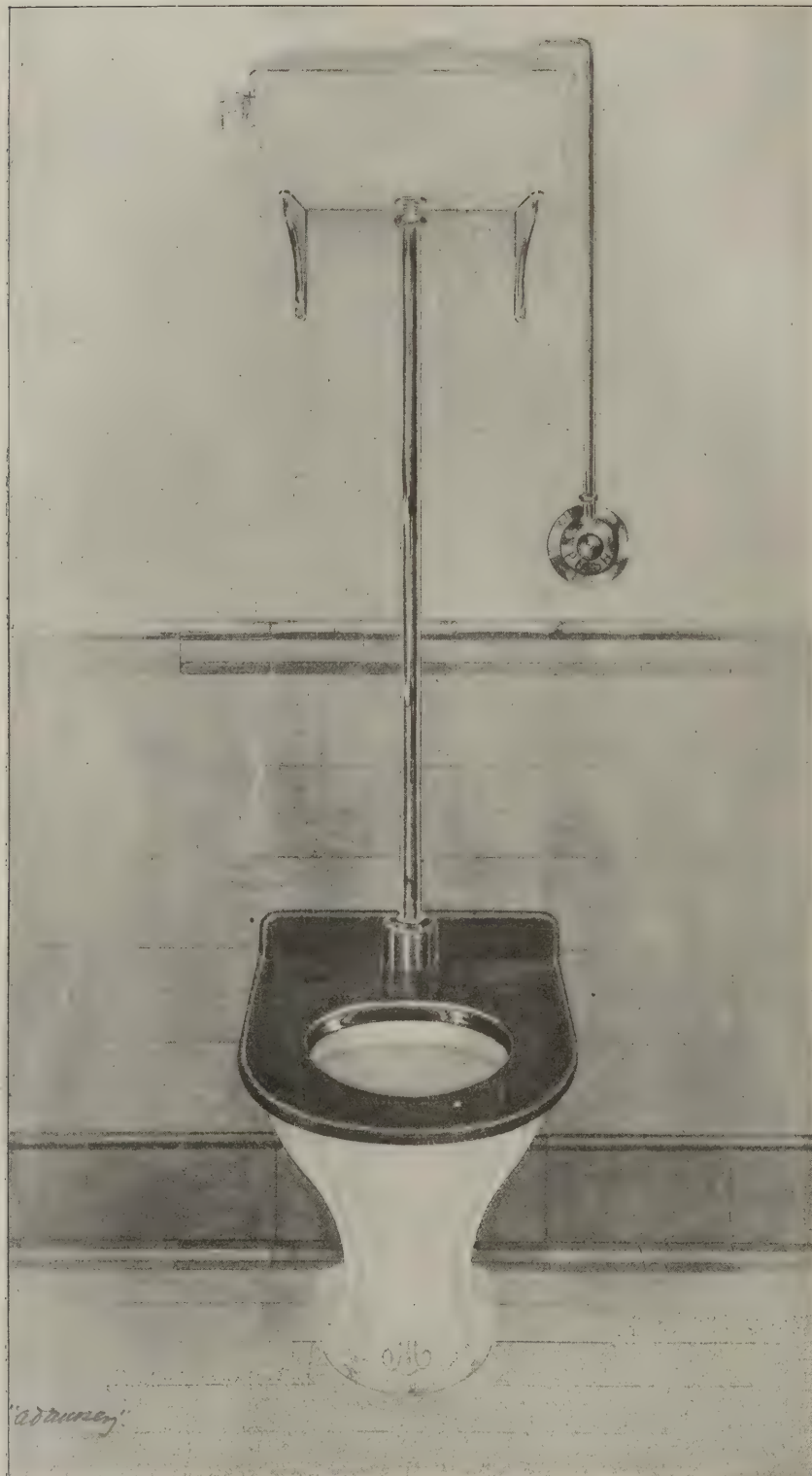
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The Apartments of
HORNTON ST KENSINGTON
for Sir Walter G. F. Phillimore Bart. Bt.
1903 ~~~~~
Architect
J. H. Chapman



THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

November 23, 1904. Vol. 20, No. 511.

6, Great New Street, Fetter Lane, E.C.

Summary.

The County Council prevents the use of ferro-concrete in London. No regulations are necessary, for trickery cannot be indulged in with this type of construction. (Page 275.)

The recommendations of the Building Act Committee for the amendment of the London Building Acts have been agreed to by the County Council, and the draft Bill is to be deposited on December 17th, so as to be in time for the next session of Parliament. Between that time and the middle of February, says the chairman of the committee, there will be plenty of time for the local authorities to discuss the details, which can be settled definitely by the Council before the end of January. (Page 270.)

Tramways over Blackfriars and Westminster Bridges and along the Embankment are proposed to be constructed by the London County Council. (Page 278.)

Mr. Justice Ridley has reaffirmed the judgment in *Ebdy v. McGowan* that, unless there is an express contract to the contrary, the plans belong to the building owner, and not to the architect, after the work is completed and paid for. (Page 277.)

Within the last twelve months a nine-storey brewery has been erected in Dublin for Messrs. Guinness. (Page 274.)

Mr. Bulmer, president of the Leeds and Yorkshire Architectural Society, says that registration would protect architects from the quacks and Pecksniffs, would lay the architectural ghost and scotch the architectural imposture. (Page 280.)

Replying to the deputation with regard to rural building by-laws which waited on him last Thursday, Mr. Walter Long promised to give earnest consideration to the matter with the object of seeing whether further changes could be made which, while not destroying the sanitary conditions for houses in the country, would avoid the needless trouble and expense now suffered. (Page 279.)

In the Court of Appeal last week decision was given in two important cases relating to house drains. The Court upheld the judgment given in *Bradford v. Mayor of Eastbourne*, which states that where a drain on private property receives the drainage of two or more houses belonging to different owners such drain is a single private drain, repairable at the owner's expense if it becomes a nuisance. (Page 277.)

In his presidential address to the Society of Architects last Thursday Mr. Walter Thomas said they did not propose to press on with registration without regard to other interested bodies, but it was to be hoped the report of the Institute committee would not be unduly delayed, as the impression was abroad that the committee had become non-existent without completing the work for which it was formed. Ireland seemed likely to lead the way with an Act of its own if the R.I.B.A. delayed much longer. (Page 276.)

The Chicago brick-makers have combined and forced builders to pay 30s. per 1,000 for the commonest bricks. (Page 276.)

Decay of Stone.

THE decay of stonework is always before us, a constant reminder of the need of safeguarding against the gradual weakening of structural stability. And yet, by familiarity, we seem to consider it a necessary evil, while some decadent minds glory in the evidences of decay. But the wear of time goes on insidiously, until we are suddenly brought face to face with the dangers of further delay. This has been the case with the Bell Harry Tower of Canterbury Cathedral. The Coal Smoke Abatement Society has done service in calling public attention to the fact that one of the causes of the decay of stone, namely, the imperfect combustion of coal, is preventable. That the influence of this is of greater importance than that of the natural agencies—rain, wind and frost—is proved by the fact that our urban buildings are decaying much more rapidly than our rural buildings. Mr. Thackeray Turner, secretary of the Society for the Protection of Ancient Buildings, has called attention to the fact that the fine tower of West Ham Church is suffering solely from the surface decay of its stone, and that the beautiful work of old Croydon Palace is fast disappearing from the same cause; while the elaborate carving on the magnificent porch doorway of Malmesbury Abbey is rapidly decaying. He suggests as a remedy that lime should be applied to the stone, as was done about four years ago at Exeter Guildhall. By this means decay is arrested until the protecting coat of lime is eaten through. The objection raised is that buildings would be disfigured by such "white-washing"; and the criticism is not to be lightly dismissed. At Exeter the lime was toned, and now, to quote Mr. Turner, "the only difference in appearance is that when we took it in hand it was black with soot, except the portions where the surface of the stone had recently fallen off, and now it is stone colour." A technical point worth mentioning is that the lime was slaked with boiling water, which results in its penetrating the stone further than lime slaked with cold water, and it adheres firmly without the addition of Russian tallow or the like. Prof. A. H. Church advocates a better method, however, namely, the use of baryta water. This was used with conspicuous success at Westminster Chapter House, and in our issue for February 3rd, 1904, we published two reports by Professor Church on the subject which clearly explained his method. A solution of hydrate of baryta repeatedly applied in dry warm weather, with suitable precautions, scarcely changes the colour of the surface, forms no skin, penetrates deeply and serves to render solid once more disintegrated stone where the damage has been wrought by the formation of sulphate of lime by turning this

soluble compound into insoluble sulphate of baryta, at the same time setting free caustic lime which in course of time becomes carbonated into chalk. Professor Church shows that a limewash is objectionable, because although it undoubtedly acts for a time as a preventive of further attack by sulphuric acid (provided it keeps its place on the decayed and crumbling walls), it must give rise to more sulphate of lime, the very substance, the formation, presence and migration of which have been the chief causes of the mischief. If such an opaque coating as milk of lime be admissible at all, then Professor Church suggests one into which precipitated carbonate of baryta enters as the chief ingredient. This substance is as effective as lime in barring out the corrosive sulphuric acid, while it can add no injurious soluble salt to the decayed stone.

The Deputation to Mr. Long.

THE reply which Mr. Long made to Sir William Grantham's deputation on the subject of the rural by-laws was most considerate and commendable. At the time when the new code for rural districts first appeared we welcomed it as overcoming most of the objections raised against the old code and as likely to be a very efficient remedy for the harm that had been caused by the former by-laws. The only thing now needed in rural districts is for the councils to substitute these by-laws for the old ones. The Local Government Board is willing, even anxious, that they should do so. The solution of this part of the trouble is to hand, but there is another side to the agitation for the amendment of the by-laws for which there is no remedy to hand—namely, in regard to the urban by-laws. It is true a new code for these was published this year by the Local Government Board, but it is not happy; indeed, it is hopelessly extravagant and severe. We can only trust Mr. Walter Long will give his attention to modifying this code, and that he may do it with as much success as in the case of the rural code. Many urban authorities have been busy this year revising their by-laws in the light of this new urban code, and steps should be taken at once to prevent further mischief. As we have pointed out before, some districts are partly rural and partly urban; and if a rural council seeks urban powers and adopts the urban code, then the by-laws work unfairly on the rural part. This can be overcome by adopting by-laws which shall discriminate between the different parts of the district. The pity is that rural councils do not seem to know this, or do not care to take the trouble to find out. Here the Local Government Board might help by refusing to pass by-laws which were not discriminatory.

LONDON BUILDING ACTS AMENDMENT.

The Opposition to the Council's Bill.

AT last week's meeting of the London County Council the Bill for the amendment of the Building Acts* was discussed for two hours and a half.

Mr. Stuart Sankey said he had received a letter from the City Solicitor stating that he had written to the Council to ask that the draft Bill should be sent on to the City Corporation for their consideration. Nothing, however, had been done in that direction, and therefore the City could offer no opinion.

Statement on Behalf of the Building Act Committee.

Captain Hemphill, chairman of the Building Act Committee, said they had written to the borough councils asking for their suggestions for the amendment of the Acts. There would be no difficulty in sending them a draft of the Bill. The Building Act Committee had sent 245 suggestions to the Parliamentary Committee for embodiment in the Bill, and, having done so, they proceeded with their proposals. The draft Bill was now in existence. It was not one for restrictions only, but granted concessions. It proposed for one thing to allow buildings of larger cubical space to be erected in London, and enabled the Council to approve buildings constructed of iron and steel and concrete. That was a concession. They also proposed to allow local authorities to supervise and control buildings under a certain size, and they dealt effectively, he thought, with the question of fire-resisting materials. They only asked the Council to approve definite principles. He did not suggest that the Council should be bound that day to every detail in the measure. They only

* See our issue for last week.

wanted an assent to the general policy. The draft Bill had to be deposited on December 17th, and between that date and the middle of February there would be plenty of time for the local authorities to discuss the details of the Bill, which could be settled definitely by the Council itself before the end of January. The Council would then have ample opportunity for discussing the amendments and suggestions made by the local authorities.

Adverse Criticism.

Dr. Napier moved an amendment that it was undesirable to proceed with the Bill in the next session of Parliament, and that it should be referred back to the Building Act Committee for further consideration with a view to legislation being sought in the session of 1906. He urged that a Bill of such importance ought to be before the local authorities for at least four or five months in order that they might give it their considera-

tion. The surveyors and architects of London knew much more about the subject than the Building Act Committee, who were showing a total disregard of professional opinion in proceeding with the Bill without ascertaining the views of the surveyors and architects. He did not believe the Committee would succeed in getting the Bill through Parliament, and it would be unwise of them to go into the fight until they were certain of coming out victorious.

The Indictment Detailed.

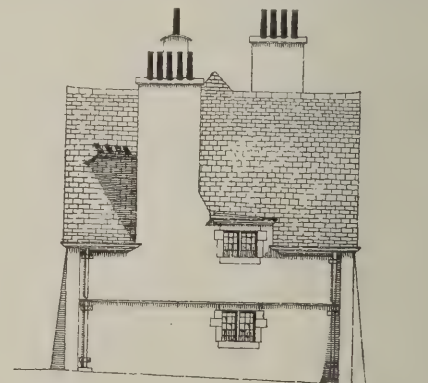
Mr. Shephard, in seconding the amendment, said he was convinced that the Bill, owing to its complicated nature, would raise such an amount of hostility from vested and individual interests that it would be useless to attempt to proceed with it. The Bill proposed that the Building Act should apply to Government property. Did they think they could get that clause passed? Then the Bill attacked the magistrates.* They



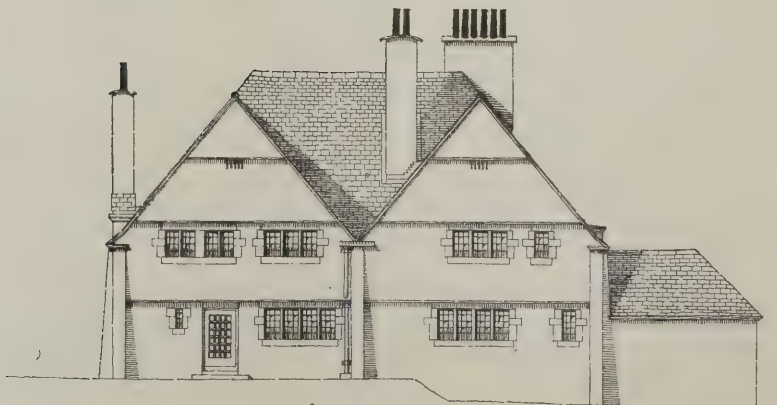
HOUSE AT CHORLEY WOOD.



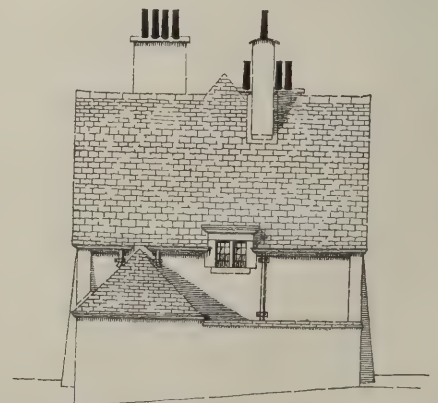
NORTH WEST ELEVATION.



SOUTH WEST ELEVATION.



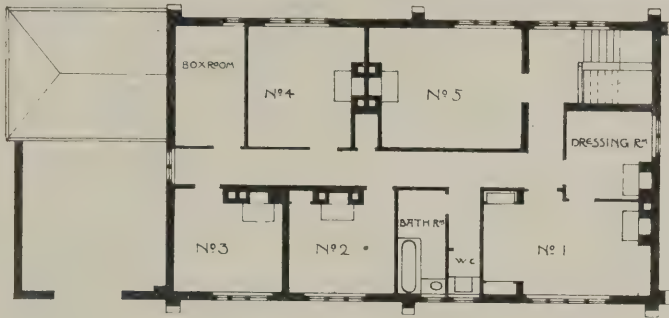
SOUTH EAST ELEVATION.



NORTH EAST ELEVATION.

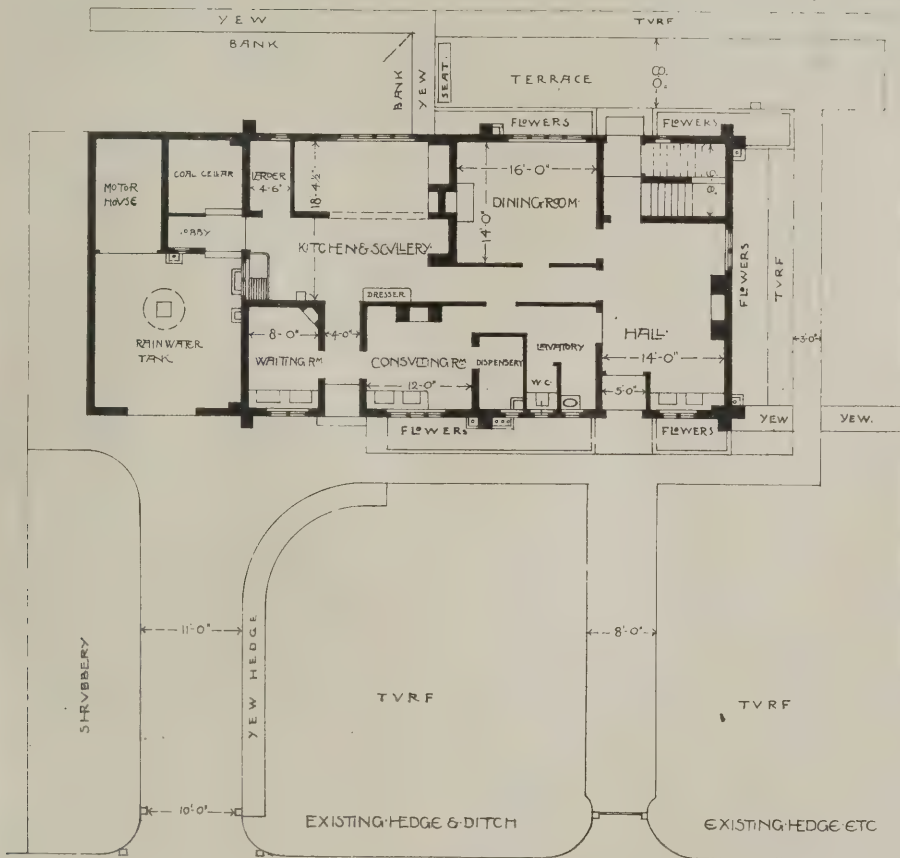
HOUSE AT CHORLEY WOOD HERTS FOR DR. H. R. FORT.

C. F. A. VOYSEY, ARCHITECT.



BEDROOM PLAN

TENNIS COURT



SHIRE LANE

HOUSE AT CHORLEY WOOD.

proposed to ignore the duties of magistrates in respect to dangerous buildings and new streets. They were going to attack the rating authority. They were "going for" the district surveyors, proposing to pay those officials by salary instead of by fees. Summonses which were issued by the district surveyors were to be issued by the Council, and, as these summonses averaged 1,000 a week, they would need a bigger staff. They were asking Parliament to abrogate its functions by making streets wherever they liked. In effect, they proposed to pull down houses just where they liked. Then they attacked the tribunal of appeal—one of the safeguards of the Act. They proposed that no practising architect or surveyor should sit on the tribunal of appeal. They were dealing for the first time with churches and chapels by insisting upon bolts and swing doors. Not content with taking people's property, they were going to alter the Lands Clauses Act. The 10 per cent. for compulsory purchase was deleted, and they wanted forecourts to be dedicated to the public. In old streets it had been held by law that if an owner re-erected a low house he could do so to the same height as his neigh-

bour's house. The Bill proposed that the rebuilt premises should not be higher than the old ones. That would mean a loss of

thousands of pounds, especially in the City of London. Other items were dealt with by Mr. Shepherd, who went on to say that clause 176 contained twenty-six offences. The Bill was drastic and offensive, and it was absurd to ask them at one sitting to pass a measure of this character. Let them use the time between now and a year hence in getting all public opinion together, so that they might be able to present a Bill which would have the deliberate opinion of London behind it.

Pros and Cons.

Mr. John Burns, in supporting the Bill, said he had heard no good reasons why they should assume that it would not be possible to get it through Parliament.

Mr. Alliston said he did not think the committee had given sufficient consideration to the occupiers of premises in London on whom eventually the cost of carrying out the provisions of the Bill would fall. He felt convinced that the Bill would very seriously interfere with the trade of the City, as traders would be at the mercy of professional men day and night.

Lieut.-Col. Rotton supported the committee, remarking that any one who had been on the Fire Brigade Committee, and knew what a hotbed of danger the City was, ought not to hesitate for one moment to press forward the matter. It would not ruin the rich City merchant, as was feared in some quarters, but it would be the means of preventing such a fire as the Cripple Gate conflagration.

Mr. E. Smith (chairman of the Fire Brigade Committee) said that the proposals in the Bill were not so drastic as some of the recommendations which his committee had made. They were determined to go on with the matter and secure the much-needed amendments in the Building Acts which the Bill proposed.

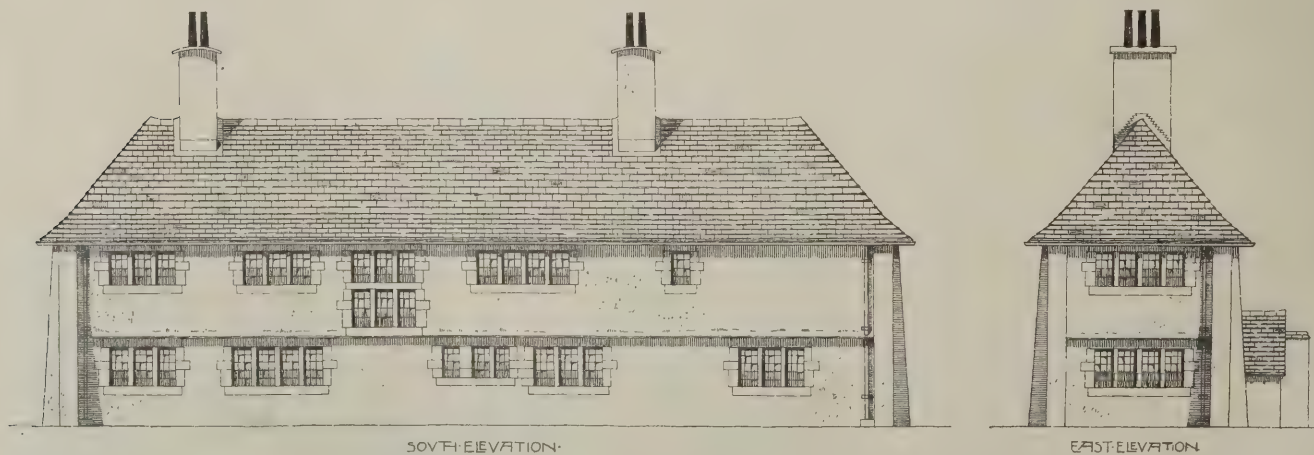
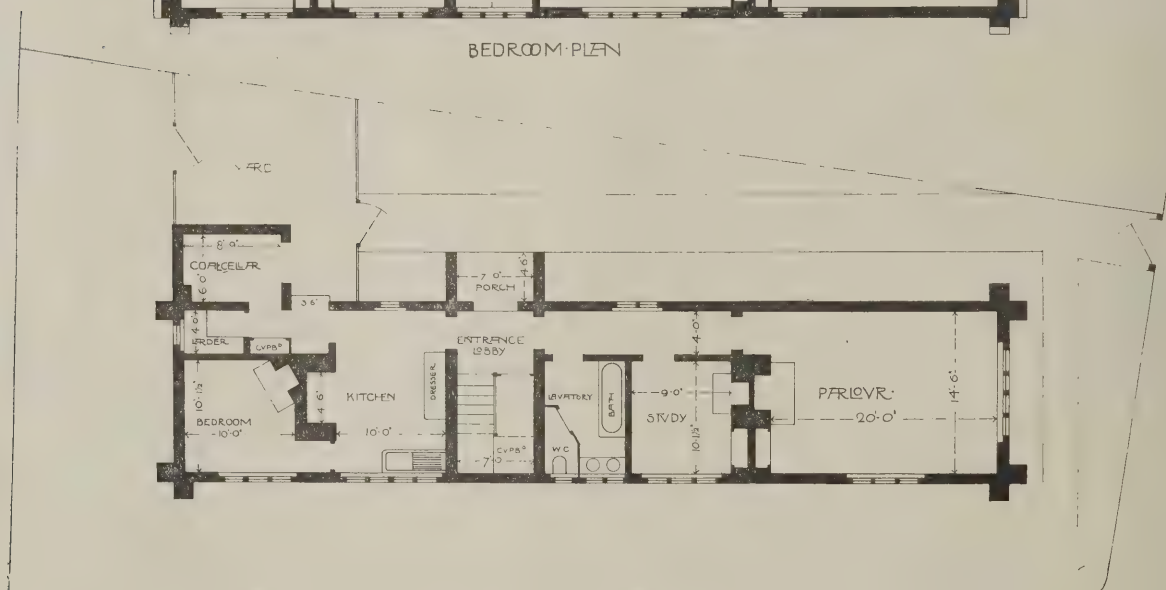
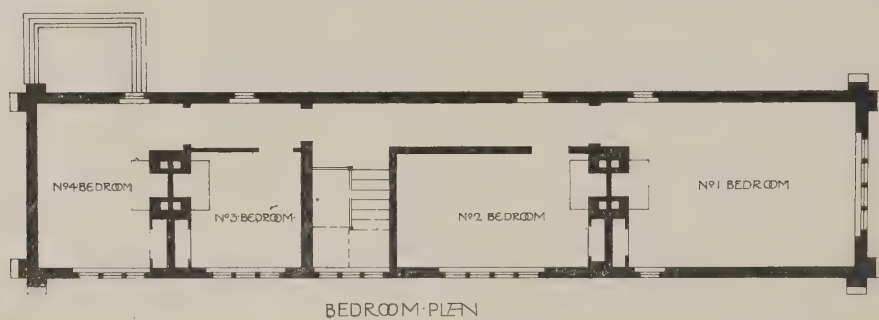
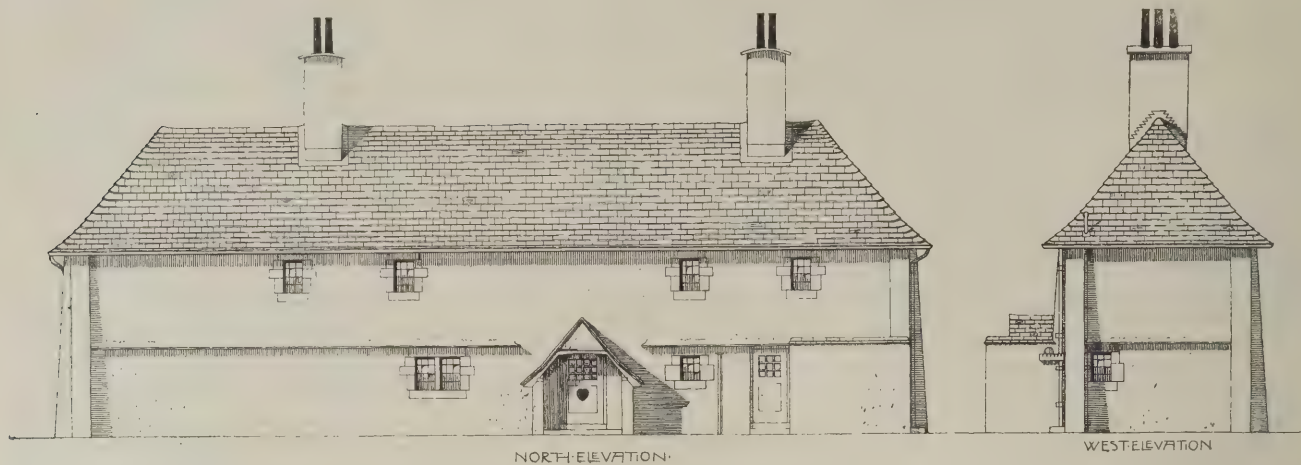
After further discussion the amendment was negatived by 75 votes to 27. The report of the Building Act Committee was then carried.

TWO HOUSES BY MR. VOYSEY.

THE accompanying illustrations show two houses in Hertfordshire which have been erected from the designs of Mr. C. F. A. Voysey, 23, York Place, Baker Street, W. The house for Dr. Fort at Chorley Wood is built of brick, cement rough-cast, with Monk's Park stone window dressings, iron casements and hand-made tile roof. Mr. A. J. Bates was the contractor. "Myholme," Merryhill Road, Bushey, for Miss E. Somers, is carried out in a similar manner, except that the window dressings are of Bath stone. Messrs. C. Miskin & Sons, of St. Albans, were the contractors.

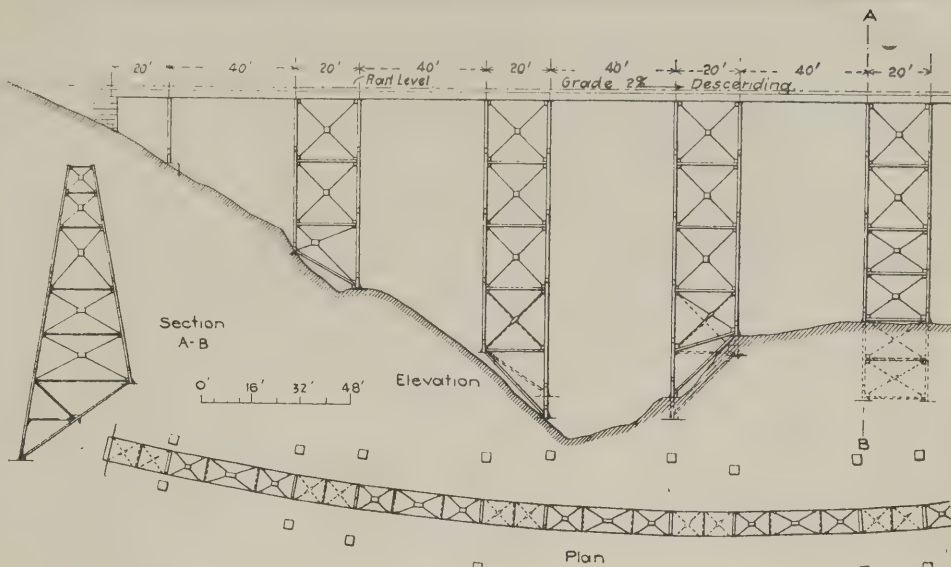
MYHOLME MERRYHILL ROAD BUSHEY FOR MISS E. SOMERS



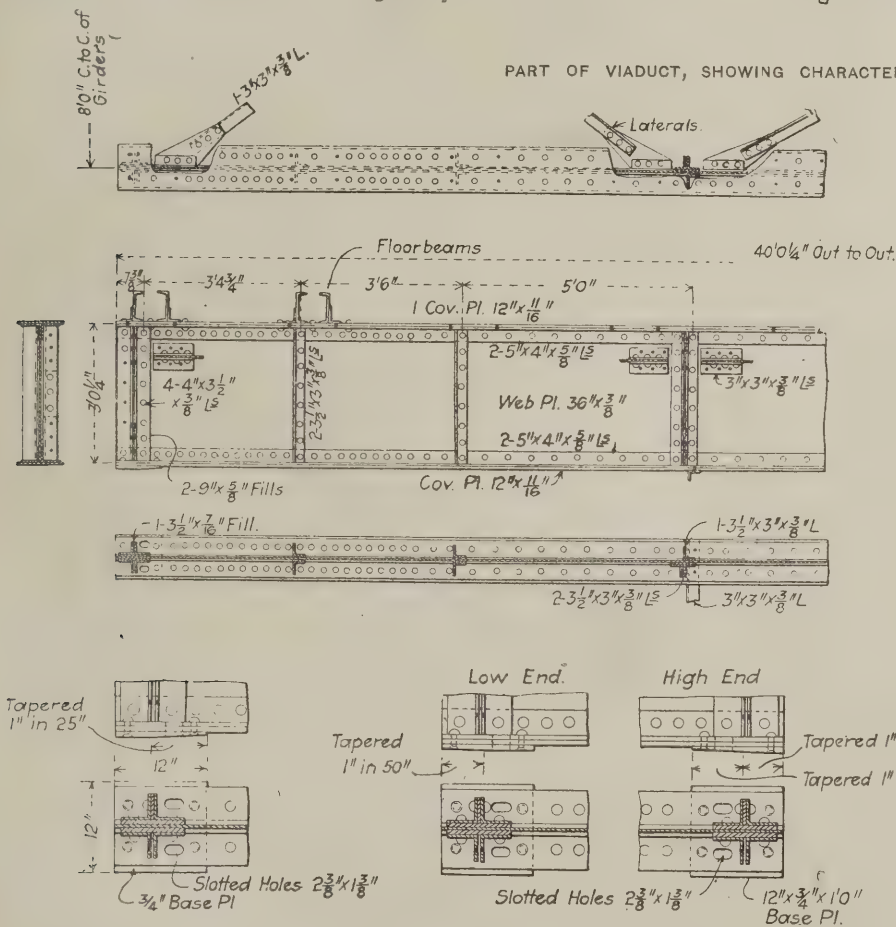


AMERICAN STRUCTURAL STEELWORK.

THE accompanying illustrations of the bridge work for the Uganda Railway in Central Africa are interesting, apart from the point of view of construction, on account of their suggestiveness regarding trade competition in the steel industry. At a time when so much is being talked of American undercutting, this contract serves to illustrate some of the directions in which our cousins on the other side are ahead of us, and by what means they secure work where English contractors have natural advantages in their favour. The American Bridge Company secured the job because they were able to guarantee to complete the work sooner and at a lower cost than the other tenderers. The great superiority of American manufacturers lies not in design and the rational development of maximum strength and efficiency, but in the fact that all structural steelwork is designed by



PART OF VIADUCT, SHOWING CHARACTER OF TRESTLES USED ON THE UGANDA RAILWAY.



HALF OF 40-FOOT CONNECTING SPAN GIRDER.

specialists usually employed exclusively on it, and is fabricated in shops devoted wholly to this class of work. These conditions have developed a surprisingly uniform practice throughout the country, so that structures specified for a certain service would be built with remarkable similarity if designed independently by different engineers and made at remote shops. Certain types and details are recognized as affording the greatest simplicity, efficiency and economy, and are widely adopted with but slight modifications.

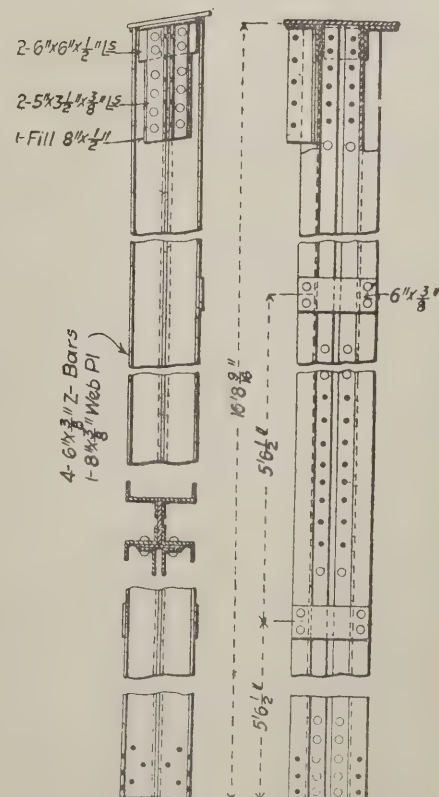
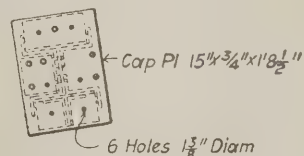
In every large shop draughtsmen are trained to design structures to comply with general plans or specifications or to redraw the separate members of structures designed by other engineers in accordance with strictly defined standards, and to meet shop requirements. Great care is taken to use as few different shapes as will suffice, and to use such materials as can be readily secured from the mills or carried in stock. The drawings

are reduced to numerous simple sheets with separate orders for different members, so that the ease and rapidity of shop work is greatly increased and a considerable saving of labour is secured by a comparatively small additional initial expense in the drawing-office. Finally, provision is carefully made in the design for the erection of the structure in the field.

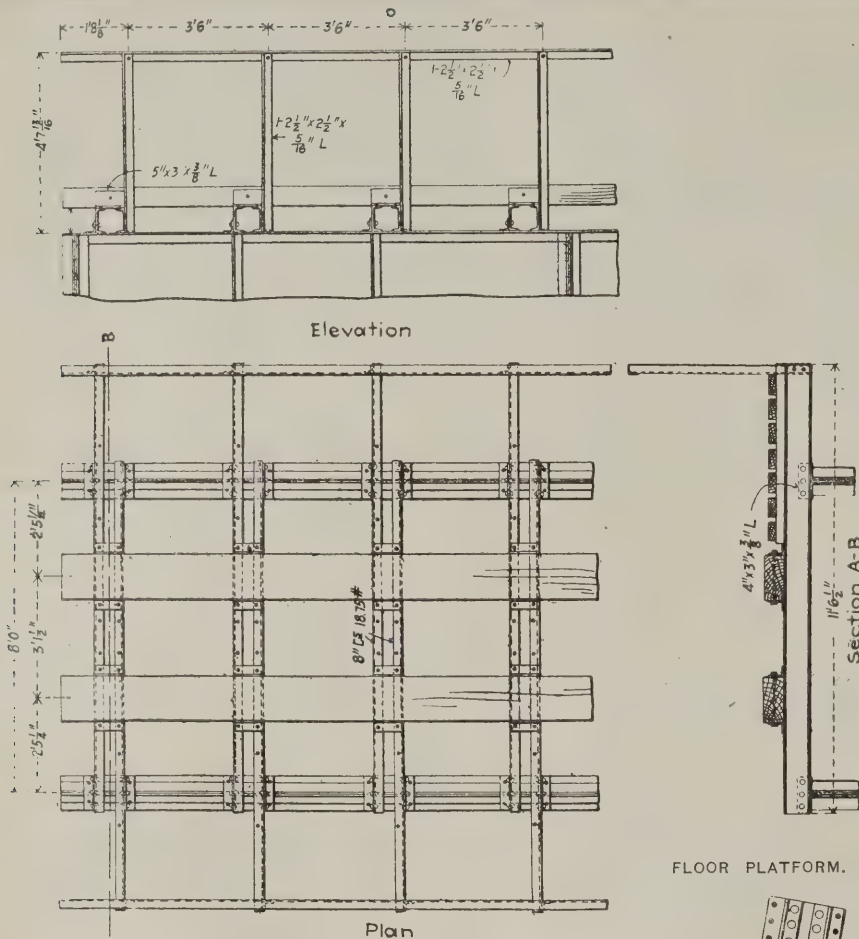
The most important deviation from ordinary American practice in the Uganda bridges was in proportioning the lengths of members for ocean transportation, and in shipping many minor pieces loose so that they would pack close, which would ordinarily be shop-riveted. Great pains were taken to make corresponding members exactly alike, and over 1,000 were made from a single blueprint sheet. All of the hundreds of pieces for each viaduct were marked and billed separately, and in order to facilitate selection and storage they were painted with distin-

guishing colours. Even with this provision it was found easier to use duplicate members in some structures, irrespective of their designation, so that when the work was completed some of the viaducts showed a dozen different colours.

The erection was accomplished in the usual way by an overhead tower traveller which assembled one panel of the viaduct in advance, thus obviating any necessity for falsework or scaffolds. Standard sectional steel derricks were provided for loading



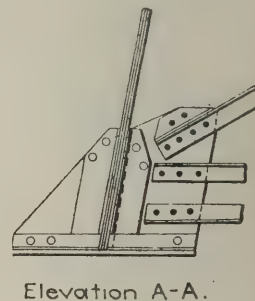
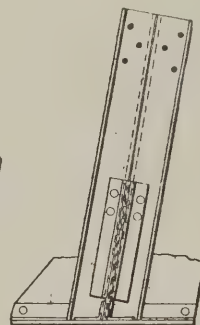
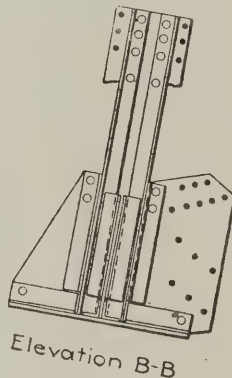
DETAIL OF UPPER SECTION OF TOWER COLUMN.



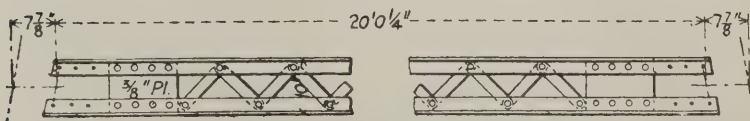
and unloading the material, steam hoisting engines were used for the heavy work, and hand-power for the light work. Work yards were established at the ends of the different viaducts, where as much as possible of the field riveting was done advantageously on the ground instead of performing it on the structure.

The Uganda Railway is a single track line 584 miles long, running from Mombassa on the Indian Ocean to Port Florence on Lake Victoria. It was built by the British Government. Sir George Whitehouse was chief engineer and Mr. J. A. Anderson principal assistant. There are twenty-seven American-built viaducts, varying in length from 160ft. to 880ft. and in height from about 40ft. to

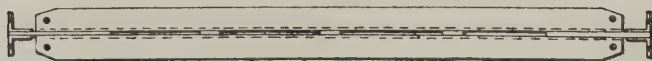
DETAILS OF
BRIDGE WORK
FOR UGANDA
RAILWAY.



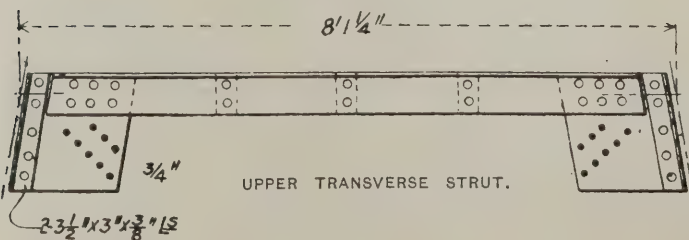
4-5" x 3" x 3/8" L
Lacing 2" x 3/8"



Lower Transverse Strut.



2-6" x 3 1/2" x 3/8" L
3-3" x 1 3/8" Fills

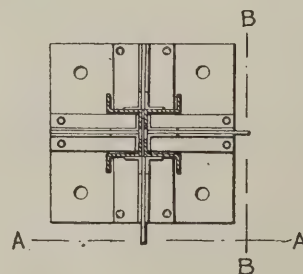


UPPER TRANSVERSE STRUT.

112ft., and having a combined length and weight of 3,000ft. and 8,000 tons. The structures were all simple plate-girder viaducts, with 20ft. and 40ft. spans alternating. They were manufactured by the Pencoyd plant of the American Bridge Co., and were sent in three separate shipments direct to Mombassa. Uniformity of design was striven for. All towers are 20ft. wide and 40ft. apart, all girders have the same depth, and the columns and bracing are substantially alike throughout. Each 40ft. girder required about 500 field-driven rivets; in all there were about 350,000 field-driven rivets.

A NEW DUBLIN BREWERY.

IN Robert Street, Dublin, a nine-storey building for Messrs. Guinness is approaching completion. It has a main frontage of 150ft. and rises to a height of 130ft. The floors, from 10ft. to 19ft. high, are designated as follows:—Ground floor, first or tun floor, second or tun stage floor, third or fermenting floor, fourth or settling back floor, fifth or yeast floor, sixth or bottom skimmer floor, seventh or middle skimmer floor, eighth or top skimmer floor. All are of concrete, arched on the ceiling with white enamelled bricks, springing off enamelled springer blocks manufactured to fit around the girder flanges, and finished on top with Mount Sorrel crushed granite brought to a fine smooth surface. Steel has been used extensively for the main structure, the walls being of Athy stock bricks built in cement-mortar and faced inside with white enamelled bricks. The roof has wrought steel prin-



BASE FOR COLUMN.

cipals supporting timber purlins and boarding, Mellows' patent glazing, and heavy slates capped with sheet lead. This large building has been erected within twelve months by Messrs. M'Laughlin & Harvey, Ltd., of Dublin. The steel construction work was carried out by Sir William Arroll, of Forth Bridge fame, Messrs. Ross & Walpole being the contractors for the steel roof work. Mr. W. Osborne has supplied the granite work and Messrs. Oates & Green the white enamelled bricks. The materials used include—4,000 tons of steel, 1 3/4 million bricks and 3,000 tons of cement. The building has been designed and erected under the control of the engineer-in-chief, Mr. A. H. Hignett, and his staff. Mr. Arthur Dudgeon was the surveyor and measurer for the work.

R.I.B.A.

Two Papers on Ferro-Concrete.

A MEETING of the Royal Institute of British Architects was held on Monday evening, Mr. Henry T. Hare, vice-president, occupying the chair.

The decease of Mr. John Norton, F.R.I.B.A., and past-president of the Architectural Association, was referred to.

Two papers on ferro-concrete were read—one by Mr. L. G. Mouchel entitled "Monolithic Construction in Hennebique Ferro-Concrete," and the other by Mr. William Dunn on the "Construction and Strength of Reinforced Concrete," the latter illustrated by lantern views.

Mr. W. Dunn in his paper said that, owing to many unpleasant experiences, there was a feeling among many architects and builders that concrete was a treacherous and unreliable material. In all such experiences there was something mysterious; the cement came from a maker of established repute, it had been specified "Best London" Portland cement, the sand and gravel looked clean, and the builder was an honest man. Nevertheless it failed to set; it cracked; it thrust out the walls, and generally led to a great deal of trouble. To make good concrete much care in the selection of the materials and in the mixing was required. The cement was the most important ingredient, and the only way to get good cement was to constantly test it and reject that which was faulty. When floors, walls, roofs or pillars are made of concrete, a bad cement is really dangerous to life.

As regards the aggregate, the strongest concrete is made with gravel; the size should vary from large sand to small stones, passing a $\frac{1}{4}$ in. or $\frac{3}{8}$ in. mesh, for floors or walls, to $1\frac{1}{2}$ in. or even more for foundations. The cleanliness of the aggregate and the water is most important, as is also the cleanliness and sharpness of the sand. Small sand, such as would run in an hour-glass, is utterly useless—the sand must be fairly large and sharp; it should vary in size; the more uneven the sizes the smaller the voids. The finer the sand the less the strength. There should never be more than 3 of sand to 1 of cement. When the concrete is eventually laid on the centering or put in the moulds, it is put in in thin layers 2 in. to 3 in. thick, and beaten down with iron beaters very carefully all over. This is essential in order to prevent the formation of voids and to increase the resistance of the concrete.

The resistance to the swelling and bursting action to which columns in concrete alone would be subject can be produced by binding the columns with iron or steel wire. Makers of concrete columns do so bind these according as the effect to be combated is more or less clearly understood. What is done in the Hennebique column is done by other concrete specialists. In all there is, first, the concrete; second, vertical bars of metal, iron or steel; third, bindings of sheet metal or wire.

The method of construction is very simple. A wooden box or mould is made in which the rods are set upright; one of the bindings is then put in, and about 6 ins. or 12 ins. of concrete well rammed down; another of the bindings is put in, and the process repeated. The special functions of the vertical rods are (a) to aid the concrete in resisting the compression due to the load; (b) to resist any tensile stress which may be set up in the concrete by unequal loading or by any want of homogeneity in the material itself, which tensile stresses cannot be safely left to the concrete to overcome. Almost all the makers of reinforced concrete constructions put their trust in the vertical rods of metal, as the special element adding strength to the con-

crete, if we may judge by the large proportion of metal so used and by the rules employed to fix the safe load, which rules take no account of the binding.

If there were no initial stresses in the combination the load would be carried by the two materials in the inverse proportion of their rigidities; that is to say, if the concrete were ten times as easily compressed as the iron or steel, it would be carrying ten times as much per sq. inch as the concrete. But the question is not so simple. Concrete setting in air shrinks, while concrete setting in water expands. Columns for buildings always set in air, and consequently the concrete shrinks. As the concrete adheres rigidly to the metal, the concrete is put in tension and the metal in compression—into a state of internal initial stress—before the load comes on.

The function of the bindings is to prevent lateral swelling and bursting. M. Considère was the first to give this its proper consideration and importance. In almost all columns, except M. Considère's, these bindings are usually about 6 ins. to 12 ins. apart, showing that the true use of the metal is not yet fully recognized.

Mr. L. G. Mouchel followed. He said that it had been his fate to be the pioneer of the new material in Great Britain.

Having explained in detail the general principles of Hennebique ferro-concrete construction, Mr. Mouchel said that it was to its great simplicity that it owed its startling success. Any labourer of ordinary intelligence could be made an apt workman in the material in a few days.

Ferro-concrete was an absolutely new material, which had come in its time to enrich the engineering world. It could not be treated as a combination of steel and concrete in which the properties of the component elements could be considered and treated separately. It had its own laws of deformation. Experiment demonstrated that a rectangular bar of concrete, when subjected to tension, showed an elongation at rupture of, say, one-tenth of an inch; a bar of ferro-concrete, of the same external dimensions and made of the same concrete, showed at rupture an elongation of an inch; that is to say, ten times greater, before showing any crack or trace of disintegration, than in the first case. The elasticity of the new material was well known; it varied in notable proportions with the distribution of the steel in the mass of concrete.

The so-called Hennebique's empirical methods could be relied upon with absolute confidence; for they had been the basis upon which over 12,000 different works had been constructed, and which, in almost every case, had been subjected to severe tests, the results of which had been carefully recorded.

As regards tests, the age of a piece of concrete is a most important element. Good concrete goes on increasing in quality year after year. It is not advisable to test to destruction samples a few weeks or a few months old. No two results will ever be alike, even on two samples of the same age, unless they are composed exactly of the same materials, mixed in identical proportions and by the same operator. The adherence of concrete to steel increases with the age of the work. Unlike construction in ordinary materials, which, if left to itself, will deteriorate, ferro-concrete construction goes on improving endlessly in quality with age. Tests must be made on the structures themselves. The Hennebique practice is always to test their structures within a very few weeks after completion with loads 50 per cent. in excess of the calculated load. When the load is removed, it is found that the floor, owing to the elasticity of ferro-concrete, regains its former level, or, at any rate, that the deflection, if any, will be quite inappre-

ciable. It could not be otherwise, for any stress applied to any part of a well-made ferro-concrete floor affects not merely the part under load, but also a very large area of the floor surrounding the part under observation. This is due to the absolute monolithism of the work. Besides static tests, there should be severe dynamic tests; without these the trials of a structure in which concrete and steel are combined are incomplete.

The great security offered by ferro-concrete construction arises from the fact that it never collapses suddenly, but always gives, long beforehand, unmistakable warnings. Owing to the absolute monolithism of Hennebique constructions, they are far less liable to vibrations than ordinary constructions.

Indisputable proofs have been given that the very best material to protect steel is concrete itself. Oxide of iron cannot exist in contact with concrete; rusted bars embedded in concrete will, in the course of a month or so, be as bright as new.

Concrete used in ferro-concrete is markedly different from ordinary concrete, both in its composition, in its make and in the way it is employed. It is composed of materials of small volume ($\frac{3}{4}$ in. maximum for the gravel or stone), and the materials used are very clean. The proportions of sand and stone are always adjusted so as to give a concrete quite full—it is used in small quantities at a time, and so vigorously rammed that no cavities or porosity are at all possible. As regards the adherence of concrete to steel, its value is such that it justifies the practice of some ferro-concrete builders who only reckon on concrete to make the junction between the different metallic parts of a structure.

Experiments have demonstrated its surprising resistance to high temperature and sudden cooling. After the most destructive fires Hennebique constructions have been found as sound as ever. At the great Baltimore fire the Hennebique buildings stood the ordeal admirably, and they are again in use as before. One of them received on its roof the top storeys of a high "sky-scraper," and it resisted that shock as well.

In his concluding observations the author referred to the mischief of the building by-laws in force in London. London enjoyed the unique privilege of being the only city in the civilized world where ferro-concrete constructions are actually prohibited. Building regulations of nearly every other city in the United Kingdom did not, read strictly, permit of the use of ferro-concrete; but, after intelligent and impartial investigation by the various authorities, Hennebique constructions had been allowed. Such buildings have been erected in London, but only on ground belonging to railway and dock companies. These facts had been brought to the attention of the London County Council when they had been applied to for permission to erect similar buildings on ground within their jurisdiction; but in vain. They always met with the same reply: "The Act stipulates a certain thickness for walls. If you give your walls that thickness you can build." But to give ferro-concrete walls that thickness would be financially an impossibility and, practically speaking, an absurdity, since the comparatively thin walls of ferro-concrete are many times stronger and safer than those stipulated in the Act. He trusted that when the new London building by-laws were framed ferro-concrete construction would no longer be excluded. Ferro-concrete construction is absolutely safe; it cannot lend itself to the malpractices of the jerry-builder. Trickery is impossible with it. Should the contractor try to cheat, try to escape the specification, detection will not occur months or years after, but at once.

The discussion was adjourned until the Business Meeting to be held on December 5th.

THE SOCIETY OF ARCHITECTS.

President's Address.

THE first ordinary general meeting of the Society of Architects for the session 1904-5 was held on Thursday evening at Staple Inn Buildings (South), Holborn, W.C., the president, Mr. Walter W. Thomas, occupying the chair.

The following were elected members:—Messrs. C. G. Bowles (Jersey), J. Forster (Carlisle), P. G. Hayward (Chatham), M. T. E. Jackson (London), A. A. Kekwick (London), A. P. Killik (London), W. H. McGaul (Barry Dock), P. B. Rigg (Morecambe), R. L. Roberts (Abercarn), W. D. Wiles (Norwich) and A. W. Worrall (Wolverhampton). Mr. E. Cavanagh (London), Miss Annie Hall (Cheltenham) and Mr. S. C. Lush (London) were elected students.

The Society's Gold Medal for the October examinations was presented to Mr. D. Griffiths, of Porthcawl.

The president then delivered his address. He said it was twenty years since their first president, a Liverpool man, delivered his inaugural address in the council-chamber of Exeter Hall, and now, on the verge of the "coming of age" of the Society, a Liverpool architect was again called upon to address them in a similar capacity. Mr. Thomas proceeded to speak about

The Education of Architects.

remarking that no institution had more cause for satisfaction at the progress which was being made than they, seeing to what it must inevitably lead; and the various architectural societies engaged in this most important work deserved the heartiest support from every member of the profession. The pioneer in the movement, the Architectural Association, had assumed a heavy responsibility in taking over and re-modelling the old Architectural Museum, and unfortunately it was hampered by a considerable debt on the building fund. Several of the provincial societies were also launching out in this direction and doing most excellent work either in connection with universities or on their own responsibility. The Society of Architects was not, any more than the senior body, a teaching institution, but he thought the time had come when it should recognize its responsibilities by founding scholarships and assisting financially those bodies who were bearing the burden of this great undertaking.

Registration: Attitude towards the R.I.B.A.

Turning to this subject, he said that some had urged them to press on without regard to other interested bodies, but if they had not always been treated with that courtesy to which they were entitled, they had the welfare of the profession too much at heart to bear any resentment or risk any precipitate action which would hinder the ultimate object for which they had been patiently striving for so many years. At the same time it was to be hoped that the report of the R.I.B.A. committee would not be unduly delayed, as at present there was undoubtedly an impression abroad that the committee had become non-existent without completing the work for which it was formed. It might be taken for granted that the Institute was pledged beyond recall to some measure, the principle of which it adopted in a somewhat vague form long ago, and it had now only to formulate that principle in a Bill to be submitted to Parliament. The Society of Architects would continue its pioneer work until, sooner or later, its object was achieved. Continual dropping wore away stone, and already there were signs of disintegration in the conglomerate of prejudice and self-interest which bound together the few remaining adherents to fossilized traditions and ideas.

The Royal Institute of Architects of Ire-

land was solid in favour of registration; so much so that it seemed extremely likely Ireland would lead the way with an Act of its own if the parent Institute delayed much longer.

The tendency among musicians, painters and sculptors was all towards federation; the musicians had a Bill before Parliament on very similar lines to their own, and the sculptors had recently formed an association for mutual intercourse and support; they also, together with painters and architects, competed keenly for the privilege of being "registered" as members of the Royal Academy, yet these same architects objected to being registered by a general council.

If registration were undesirable, or the principle of federation as applied to the practice of architecture were a wrong one, why and on what other principle were the many architectural societies founded, from the R.I.B.A. onward? Did not their very existence imply agreement with the principle, and had they not recently expressed adhesion to it with no uncertain voice?

The Institute had before it a great opportunity. Would it rise to the occasion?

Ancient Lights: Municipal Architects.

Speaking of the Ancient Lights Bill, Mr. Thomas said it was hardly sufficiently drastic in its proposals, practically amounting to transferring the procedure from the lawyers' hands to the surveyors'.

Considering the question of architects and local authorities, he said that where it was found advisable to employ a municipal architect he certainly thought his duties should be of an advisory nature only, and that his appointment should be such as would preclude the necessity of his competing with the ordinary practitioner.

There was probably no time when professional advice was more needed by public bodies than at present, yet professional men to a large extent were chary of coming forward as representatives of the ratepayers, on account of the time they must necessarily give to public duties, very often to the detriment of their own immediate interests.

Competitions.

With regard to architectural competitions and the complaints so often made of unfair conditions and unsatisfactory results, the remedy was in the hands of individuals. So long as promoters saw that no conditions, however unreasonable, would deter some architects from competing, so long would the profession have to put up with treatment which would not be tolerated for a moment by any other body of professional men.

If all doubtful competitions were severely left alone, promoters would soon recognize that there was such a thing as professional etiquette among architects.

Cheaper Houses.

In alluding to this subject the president referred to building in rural districts, observing that in the public interest there must necessarily be regulations of this kind, but there should be means of adapting them to particular districts or particular circumstances: no hard-and-fast line could be drawn, and those who administered the by-laws should be allowed a certain amount of latitude for the exercise of common-sense and discretion.

For Members in Particular.

In conclusion Mr. Thomas urged members to do all they could to increase the membership of the Society. If they could emerge from their twenty-first year with a membership of at least 1,000, this would enormously increase their powers for good; and the thing could be done if only each member introduced at least one new member before the next meeting.

A vote of thanks to the president for his address was proposed by Mr. R. W. C. Dick and seconded by J. F. Parker.

Builders' Notes.

The Building Trade at Holyhead is busier than it has been for years past.

Scarborough Master-Builders' Association.

—At the recent annual meeting of this Association Mr. A. W. Sinclair was elected president and Mr. R. H. Carr vice-president.

Barrow Joiners: A Settlement.—The joiners at Barrow have accepted the following working hours:—November and February, 47 hours per week; January and December, 44 hours. During these months their wages will be increased $\frac{1}{4}$ d. per hour.

Glasgow Streets and Buildings.—In his annual report, Mr. Thomas Nisbet, Master of Works in Glasgow, states that there has been a nett charge against revenue of £55,971 for the repair of the city's streets during the past year. There was a considerable reduction in the total number of linings granted by the Dean of Guild for dwelling-houses.

Wallpaper Manufacturers, Ltd.—The report for the year ended August 31st states that the profit has been £241,792, to which has to be added £81,987 brought forward, and that, after payment of debenture interest, the interim dividend on the preference shares, and income tax, the amount available for further appropriation is £256,936. The directors propose to pay a dividend at the rate of 8 per cent. per annum on the ordinary shares, £30,000 being put to reserve and £115,514 carried forward.

Building Trade Brisk in Chicago.—The building trade at Chicago is brisker than in any year since 1893, the year of the Columbian Exposition, which gave an abnormal impetus to the erection of houses. Bricks, however, are dear, the commonest grade being 7·20 dols. (30s.) per 1,000: this is the result of a combination among the manufacturers, who, while forcing the Chicago builders to pay the price above named, ship their surplus to St. Louis, where they sell them for 2 dols. a thousand less. Pressed bricks cost 26 dols. (108s.) per 1,000.

Builders' Association formed at Bath.

The growing dissatisfaction of builders and the building trade generally with the new by-laws of Bath has culminated in the formation of "The Association of Bath Builders," of which Mr. Herbert Clarke has been elected president. It was generally conceded that building under the new laws as compared with the old meant an increased cost of from 15 to 20 per cent. Many of the items which caused this difference were absolutely unnecessary and did not increase the selling value of the property one iota. Very general satisfaction was expressed with the attitude taken up by Mr. Justice Grantham.

Imported Building Materials in Cape Colony.

—With the object of bringing before the notice of the Government the disabilities which the building trades of Cape Colony suffer owing to the enormous scale on which building material is imported—particularly joinery—a deputation representing the Cape Town Builders' Association and the Trades and Labour Council recently waited on the Treasurer-General. It was pointed out that if the duty on manufactured building materials were increased, work could be found for a good many of the unemployed, while machinery in the peninsula to the value of £60,000, which was now only running half-time, could be used to its fullest capacity. The Treasurer-General said Government was quite in sympathy with the object of the deputation, but their hands were tied until next May. Before the next Customs Conference was held, however, they would see what could be done to safeguard the interests of all concerned.

Law Cases.

Compulsory Acquisition of Land by Councils.

—The case of *Parry v. The Metropolitan Borough of Hammersmith* was heard last week in the King's Bench Division. This was a motion by the vicar and churchwardens of St. Paul's Church, Hammersmith, for an interim injunction to restrain the Hammersmith Borough Council from enforcing the compulsory powers given them by Michael Angelo Taylor's Act (57 Geo. III., cap. 29), under which the council proposed to acquire a portion of St. Paul's churchyard for the purpose of widening Queen Street, Hammersmith. The ground of the application was that the borough council were not exercising this statutory power *bona-fide* for their own purposes, but merely to assist the London County Council to acquire the land compulsorily for their Queen Street improvement.—Mr. Justice Warrington said it was agreed that the principle to be deduced from the cases that had come before the courts was that a local authority desiring to put into operation the powers of section 80 of Michael Angelo Taylor's Act must *bona-fide* come to the conclusion that it was expedient to widen the street in question, and, having come to that conclusion, must further *bona-fide* adjudge that the land in question projected into and obstructed such widening and must therefore be acquired. His Lordship found on the facts an honest and *bona-fide* determination on the part of the borough council that it was expedient to widen this street, none the less so that the occasion for it was the proposal by the County Council to bring a tramway into the street and to make a contribution of two-thirds of the cost of the necessary widening. He therefore refused the motion.

Drain or Sewer: Important Appeal Cases.

—Two appeal cases raising the same point about house drains were decided in the Court of Appeal last week. In the first a Mr. Thompson had been required by the corporation of Eccles to relay and repair a certain defective drain or sewer, which was part of a gin. drain or sewer running through and under the cellars of seven houses belonging to him, and receiving the drainage of each house before falling into the corporation's main sewer. Thompson contended that as the drain of the house in question received the drainage of more than one building not within the same curtilage belonging to the same owner, it became a sewer under the provisions of sections 4 and 13 of the Public Health Act, 1875, and was consequently vested in the local authority, and that it was the duty of the local authority to repair, cleanse and keep it so as not to be a nuisance or injurious to health. The justices found that the drain complained of was used by two or more houses belonging to different owners, and they declared that it was a single private drain within the meaning of section 19 of the Act of 1890; consequently they made an order on Thompson to abate the nuisance. The Divisional Court were of opinion that the drain in question was a sewer and not a single private drain, and that section 19 of the Act of 1890 had no application; they consequently reversed the decision of the justices. The corporation appealed.—The second case was that of *Haedicke v. Friern Barnet Urban District Council*, in which the plaintiff claimed to recover £73 spent on relaying a sewer of certain houses in New Southgate.—The Court of Appeal allowed both appeals. The Master of the Rolls said with reference to the first it raised the question as to the effect of section 19 of the Public Health Acts Amendment Act, 1890, and how far it extended in altering the former state of the law. By sub-section 1 of that section, "Where

two or more houses belonging to different owners are connected with a public sewer by a single private drain, an application may be made under section 41 of the Public Health Act, 1875 (relating to complaints as to nuisances from drains), and the local authority may recover any expenses incurred by them in executing any works under the powers conferred on them by that section from the owners of the houses." By sub-section 3, "For the purposes of this section the expression 'drain' includes a drain used for the drainage of more than one building." Up to that time a pipe used for the drainage of more than one building was a sewer and not a drain. Therefore by subsection 3, for the purposes of that section only, the expression "drain" was to include a drain used for the drainage of more than one building. That section applied to section 41 of the Public Health Act, 1875, which provided that if any drain on or belonging to any premises was complained of as being a nuisance or injurious to health, and if on examination the drain appeared to be in bad condition or to require alteration, the local authority were to require the owner or occupier of the premises to do the necessary works, and if default was made they might do the works themselves and recover the expenses from the owner. The word "drain" there meant a drain in the old sense as one used for the drainage of one building only. The drainage in the present case was used for the drainage of two or more houses belonging to different owners, and was indistinguishable in its character from the drain in many of the cases referred to in the course of the argument, and notably in the case of *Bradford v. Mayor, &c., of Eastbourne** (1896, 2 Q.B., 205). The question as to the true meaning of section 19 of the Act of 1890, and especially the meaning of the words "single private drain," had been the subject of discussion in several cases. Upon examining those cases it seemed to him that there was a clear balance of authority in favour of the appellants: therefore the first case must succeed. With reference to the second case, the drain was indistinguishable from the drain with which he had been dealing in the first case. There was, however, a further point. The plaintiff was called upon by the local authority to abate a nuisance existing in a drain within the definition in section 19 of the Act of 1890. The plaintiff did the work, and brought this action to recover the amount so expended by her from the local authority upon the ground that she had been compelled to do work which they were legally compellable to do. The answer of the local authority was that, though before the Act of 1890 the pipe would have been a sewer repairable by the local authority, and though it might still be for other purposes a sewer, by section 19 it was now a single private drain, and by the combined effect of section 41 of the Act of 1875 and section 19 of the Act of 1890 the plaintiff must do the work. Upon the question whether the pipe came within section 19 the case was governed by the decision in the first of these two appeals. The further contention, however, was put forward that, assuming that the pipe was a single private drain within the section as between her and the local authority, the latter had not taken the proper steps to render her liable, and as they could not localize the cause of complaint as against her they could not say that she, and she alone, was liable under the sections to make good the defect; and that, as they had not taken the necessary steps for insisting upon her liability, and that the burden of repairing

* The judgment in this case was that where there is a drain laid in private property, and receiving the drainage of two or more houses belonging to different owners, and not being a drain which any member of the public has the right to use by connecting it with the drain from his own house, such a drain is a single private drain within section 19 of the Act of 1890.

the defect was still upon the local authority, the answer to the contention was plain. Broadly speaking, the Legislature had thrown back upon the private owner what had been placed upon the local authority—namely, the remedying of a nuisance existing in a single private drain as specified in section 19 of the Act of 1890. That being so, the obligation of abating the nuisance in the drain lay upon the plaintiff, and she was debarred from saying that any work done by her was done in relief of the local authority. The Legislature had laid the burden on her and not on the local authority, and therefore she could not say that the burden was on the local authority by reason of their not having taken steps to place that burden on her. The appeal in this case must also be allowed.—The Lords Justices delivered judgment to the same effect.

Ownership of Plans.—The case of *Gibbon v. Pease* was heard last week in the King's Bench Division. The plaintiff, Mr. H. Gibbon, of Ealing, had some shop premises in Bayswater converted into flats under the direction of the defendant, Mr. C. E. Pease, architect, of Clifford's Inn, and the question was whether the plans, bills of quantities, specifications and other papers belonged to the architect after the work had been completed and paid for.—Mr. Justice Ridley, following the judgment in *Ebdy v. McGowan*, held that the plans belonged to the building owner unless there was an express contract to the contrary.—Defendant agreed to hand over his plans to the plaintiff provided the Court of Appeal affirmed his Lordship's judgment, and on that understanding nominal damages for 1s. were given against him.

SURVEYORS' INSTITUTION.

President's Address.

IN his presidential address to the Surveyors' Institution Mr. H. T. Steward referred to rural by-laws. He said that many rural district councils, no doubt with laudable intentions, had adopted model by-laws framed on the London Building Act, a statute totally inapplicable to cottages in the country, with the result that landlords and others were discouraged from providing them, as the cost of building was altogether disproportionate to any return that could be obtained. Referring to public buildings, he said that while we should strive for spacious streets and fine vistas, which could be secured by regulating the street lines, he would be sorry to see the present picturesque irregularity of our street architecture superseded by the uniformity characterizing many of the much-lauded streets of Berlin; and he hoped the days were far distant when London would be disfigured by monstrous steel frame erections like those of Chicago and Manhattan Island. It was quite possible we might resort to steel frame buildings before long, and then the Building Act would need to be modified so as to avoid the incongruity of a building entirely supported by steel construction, yet having walls carrying practically nothing and being of the same thickness as though they supported many storeys. The steel construction system had drawbacks, but economy of material, and the consequent saving of labour and space, would be the main advantages of the system. In this country there seemed to be a prejudice against employing ironwork extensively in buildings, principally on the ground of its behaviour when exposed to great heat; but he did not think the last word by any means had been said on the question of fireproof construction and on the precautions that might be taken to protect ironwork from the effects of a fire.

Turning to the building trade, he said it was undeniable the rise in wages had been

accompanied by a great decrease in the number of bricks laid per man per day it was declared by many who ought to know that 400 or 500 was now regarded as a fair average, as compared with 800 to 1,000 bricks some years ago. To counteract the combined influences of increased wages and decreased work, builders had adopted labour-saving devices, not from any desire to injure the workman, but because the saving of time and the rapid turnover of capital were necessary to the existence of a business of the kind under modern conditions, and it was for this reason, among others, that he thought we might some day see the adoption of American methods on a large scale.

Keystones.

Mr. John Belcher will act as assessor in the competition for new public libraries at Islington.

Mr. J. Howard Colls has been examined by the Tariff Commission as to the building trade.

Mr. Gilbert Scott was the guest of the Liverpool Philomathic Society at their annual dinner last Wednesday.

A new London Fire Station is to be erected at a cost of about £25,000 in place of the present Waterloo Road station.

The King's Theatre, Kirkcaldy, has been built at a cost of £19,000 from designs by Mr. J. D. Swanston, architect, Kirkcaldy.

New Boys' Brigade Headquarters at Warley have been erected. Mr. Hugo R. Bird, of Brentwood, was the architect, and Mr. F. W. Burtwell, of Brentwood, the contractor.

Northampton Institute.—Lord Reay will deliver the prizes for the past session on Friday, December 9th, at 8 p.m. A conversation will follow, and will be continued on the next evening.

Embankment Trams.—In the next session of Parliament the London County Council will apply for powers to construct tramways over Blackfriars Bridge and along the Embankment, to connect with the proposed tramways over Westminster Bridge.

Huge new Statue in St. Peter's, Rome.—A colossal statue of St. John-Baptist de La Salle, surrounded by children, has been placed above that of St. Philip Neri, close to the Chapel of the Holy Sacrament in St. Peter's. It consists of a single block of Carrara marble, weighing 18 tons, and it took fourteen oxen nearly three hours to drag it from the Via Flaminia to the Piazza San Pietro.

The Warming and Hot-water Supply of the King's Sanatorium, which is now being built at Midhurst, in Sussex, from the designs of Mr. H. Percy Adams, F.R.I.B.A., has been entrusted to Messrs. Dargue, Griffiths & Co., Ltd., of Liverpool and London. At the boiler-house is a central plant, immediately under the supervision of the resident engineer, consisting of boilers, economizers, pumps, generators, engines, dynamos, &c., from which is supplied the power requisite for all purposes throughout the buildings. The general warming is on the "D.G." economic-centralized system with a positive circulation by low-pressure hot water warmed in generators by exhaust steam, so utilizing what would otherwise be a waste product. Radiators are used throughout, all under control. For the chapel and dining hall an alternative system is provided. The floors are heated over their entire area and are of special construction, solid throughout, so that there is no lodgment for dirt and dust. The hot-water supply is on the same principle as the general heating, exhaust steam being used in a similar manner.

The North-Eastern Hospital will not be ready for another year. Messrs. Treadwell & Martin are the architects.

The new Post-Office at Gainsborough is being heated by Messrs. Stanley Sheen & Co., heating engineers, of Sheffield, on their patent small pipe safe-pressure hot-water system.

Preservation of Garden Squares in London.—The London County Council intend to seek Parliamentary authority next session for the permanent preservation of garden squares and enclosures in the metropolis.

Surveyors' Institution.—The Council have awarded the prize offered by the president (Mr. H. T. Steward) to Mr. F. H. Osmond-Smith for his paper on "Forestry Hints for Land-owners and Land Agents," and honourable mention has been made of Mr. H. Lemmoin-Cannon's paper on the "Public Health Act, 1875."

Gloucester Municipal School of Art.—The members of the architectural class recently paid a visit of inspection (the second of the session) to the new Board schools in course of erection in the Calton Road, Gloucester, from the designs of Mr. W. B. Wood, A.R.I.B.A., who explained to the students the general arrangements, planning and construction.

Sir William Grantham's Cottages.—Last Friday the Chailey Rural District Council decided to take steps to prevent Sir William Grantham from infringing their by-laws, and again rejected the plans of cottages submitted by him as being inadequate to the requirements of the Local Government Board and the local by-laws.

Fire Escapes and Stairways in City Buildings.—In the next session of Parliament the City Corporation will make application to bring in a Bill giving them power to apply for, and the Court of Summary Jurisdiction to make, orders requiring owners to construct stairways or other means of escape from fire, or, in case of default, for the Corporation to provide the same at owners' cost; and to impose and recover penalties.

Titled Architects.—Referring to the editorial note in last week's issue with regard to titled architects, Mr. A. H. Ryan-Tenison, F.R.I.B.A., writes pointing out that, in addition to those named by us, there is Sir Walter Barrow, third baronet, at present at Bourne-mouth. The title was earned by the great naval captain who found the north-east passage and gave the name to Barrow Point. "Sir Walter served his articles, I think, with Messrs. Micklethwaite & Clarke, or, at any rate, was with them for many years, and he has seen many important works through. I am not sure whether he practices at present, but he is a member of the profession and a man of much taste and learning."

Quick Delivery and Fixing of Steelwork.—A tender was asked for 260 tons of steel constructional work, consisting mostly of stanchions and riveted girders from 29ft. to 43ft. long, with a small proportion of joists. Every portion of the work required cutting and fitting in accordance with the architects' requirements. Time was of prime importance. The material had to be supplied and fixed under a penalty of £5 per day. Four firms were asked to tender, but only one would undertake the work under the conditions, namely, Messrs. Measures Brothers, Ltd. The order and plans were placed with this firm on October 12th, and the first delivery was made on that date. A floor was completed and fixed before the foundation stone was laid on October 15th. Four days later the whole of the next floor was despatched, and on October 26th the balance was delivered, some twelve days under penalty time, the work being supplied from the London and Croydon works of the company.

A new Pavilion at Torquay is to be built by the Town Council. It will be 145ft. by 50ft., and will have a long verandah overlooking the Princess Gardens. Messrs. Macfarlane, of Glasgow, are the builders. The cost will be £7,000.

A Fire Test.—With reference to the new York fire test on p. 10 of the supplement to this issue, we are informed that after the test the manufacturers were given permission to use their system on any building in New York City and State.

Prof. Herkomer's Art School at Bushey was sold by auction last week for £1,300. It was founded in 1883. One of the most striking decorations of the school—a reredos designed by Sir Christopher Wren and executed by Grinling Gibbons—was sold separately for £650. For many years it was the property of St. Matthew's Church, Friday Street, City. When the church was pulled down twenty years ago the reredos was bought and presented to the Herkomer School.

Four new Hebrew Wards at the London Hospital have been erected from the designs of Messrs. Rowland Plumble & Harvey. They are on the top floor of the west wing and provide accommodation for fifty-four additional in-patients—twenty-seven men and twenty-seven women. Each is about 72ft. long, 21ft. wide and 12ft. high, with sister's room, scullery, bathroom, &c. A large kitchen for the purposes of the Hebrew dietary is placed centrally between the wards. Teale's stoves are used for warming. The cost of the new wards has been £20,000. Messrs. Perry & Co., of Bow, were the contractors.

New Buildings at Liverpool University.—New buildings of the medical school and physics laboratory at Liverpool University have been erected, the former from designs by Messrs. Waterhouse & Sons, of London, and the latter from designs by Messrs. Willink & Thicknesse and Prof. F. M. Simpson, joint architects. The two blocks of buildings, together with the laboratories already built by the late Rev. S. A. Thompson Yates and Mr. William Johnston, extend in an unbroken line from Brownlow Street on the west to Ashton Street on the east, completing the northern side of the University quadrangle. Their total cost has been about £56,000. Messrs. Tomkinson & Sons, of Liverpool, were the contractors for the medical school (excepting a portion of the fittings, supplied by Messrs. Vickers, of Nottingham), and Messrs. Brown & Backhouse, of Liverpool, were the contractors for the physics laboratory. The rooms are heated by low-pressure hot water and ventilated by an exhaust fan in the roof.

Restorations in Rome.—Considerable outcry has been raised in Rome against an act of vandalism at the famous church of St. Paul's-outside-the-Walls. A special feature of this church is the ancient cloister, dating from the end of the twelfth and the beginning of the thirteenth centuries, and considered to be one of the finest examples of cosmato work. The cloister has a vaulted roof, and for this there is now being substituted a sloping roof of painted wood, in the style of a smart restaurant. A commission, which includes Commendatore Boni, has been appointed to enquire into the whole matter. Rome is gradually being "improved" out of recognition. Two frightful enormities have recently spoilt one of the most picturesque parts of the city—the glaring aluminium roof of the new synagogue, which is now a prominent object from everywhere, and a red-brick edifice resembling a child's dolls'-house which has been built on to the House of Crescentius, one of the most interesting mediæval structures in Rome.

CHEAPER COTTAGES.

Deputation to the Local Government Board.

A DEPUTATION of about 100 gentlemen waited on Mr. Walter Long at the Local Government Board's offices in Whitehall last Thursday, with the object of stating the hardships, difficulties and impossibilities of complying with the rural district by-laws in relation to the building of cottages. Sir William Grantham, who introduced the deputation, referred in the course of his speech to the class of men who constituted rural district councils and administered the by-laws. Instancing the Chailey Rural District Council, he said it comprised twenty men, ten of whom were farmers, two retired tradesmen, one a retired timber merchant and two clergymen: and all plans were sent to one member who was a builder. The surveyor formerly kept a public-house and had blossomed forth into his present position after having failed at farming. It was never intended that the power wielded by these rural district councils

should be exercised by men like this. There was practically no appeal from the councils, and landowners who wished to build were absolutely in their power. Such a position, say, on an estate like the Duke of Sutherland's or Lord Coventry's was absurd, and he ventured to suggest that the only hope of effecting an improvement was to withdraw the whole of the by-laws and start afresh, or, if that course were not adopted, the by-laws might be withdrawn and a plan devised under which the rural district council should appeal either to the Local Government Board or to the county council or to the magistrates—at all events to some independent authority—to decide whether a particular district should be put under the by-laws or not. The Duke of Sutherland, Lord Coventry, Mr. Albert Pell, Mr. A. R. Stenning, the Rev. C. Leslie Norris and Sir William Chance (chairman of council of the Building By-laws Reform Association) also spoke. Mr. Pell mentioning how a rural district council in Essex had insisted on the thatch on two brick cottages being removed and replaced by tiles;

Mr. Stenning contending that buildings of wood should be allowed in the country and that councils should not be authorized to ask for plans, which were an unnecessary expense and very often were not understood; while Sir William Chance said that if the amended by-laws issued two years ago were adopted in rural districts they would go a long way to get rid of the disadvantages under which they at present laboured.

Mr. Long's Reply.

Mr. Long said the duty of the Local Government Board was not to force by-laws on any local authority, but to frame model by-laws, one set for urban districts and one set for rural districts, and it was open to a rural local authority to apply for the urban by-laws if considered desirable in their district. The invariable practice of the Local Government Board when applications were made either to approve a set of by-laws or for the extension of urban by-laws to rural districts was to do their best to investigate the local circumstances, and to satisfy themselves that there was need in that rural locality for the urban powers. He did not think it was possible for a central department to go further than that. He was not quite sure that the by-laws were really so guilty as some seemed to think. He had some personal experience in the matter of providing houses for labourers, and, knowing that there were practical difficulties to encounter under the then existing by-laws, one of the first things he did on coming to the Local Government Board was to examine and overhaul the two sets of model by-laws. He started with the idea that it might be possible to have three sets—urban by-laws for populous urban districts, rural by-laws for purely rural districts, and an intermediate set which would be applicable to those rural districts which were in the process of transition and were passing from country into town. The rural code was drawn up in the Department and approved by him, and he was very glad indeed to hear it referred to in approving terms by Sir William Chance. He believed that code could not be condemned in respect of any of the charges brought against the urban code or the old rural code. This new code dealt with the three subjects of sanitation, stability and prevention of fire. In his judgment, in dealing with cottages in purely rural districts stability was not a matter of concern to anybody except the owner and the tenant, and he decided that that provision should be left out altogether. In regard to prevention of fire, so long as the cottages were detached he thought the by-laws need not in any way interfere, but with reference to sanitation, it was the duty of the Department to frame by-laws which should be applicable to all that was involved in that matter. Any rural local authority could apply to withdraw the existing by-laws and could obtain in their place the code which was drawn up two years ago. He was prepared to examine that code again with every sympathetic desire to remove unwise and unnecessary restrictions, though if it were examined he believed it would be found to be on the whole a workable code. He promised to give earnest consideration to the suggestion that he should appoint a committee, or at least obtain counsel, to see whether further changes could be made which, while not in the least destroying the sanitary conditions for houses, would not expose people to needless trouble.

Prof. Henry Adams, M.I.C.E., has recently retired from the City of London College, where for thirty-five years he has been head of the Engineering Department; he is, however, still continuing his practice as a consulting engineer at 60, Queen Victoria Street, E.C., where he has had offices for the last twenty-five years.



FLOOR PLANS, REBUILDING OF HORNTON STREET, KENSINGTON.
FRANK S. CHESTERTON, ARCHITECT.

The extensive rebuilding of Hornton Street, Kensington, for Sir Walter G. F. Phillimore, is being carried out in red bricks and a French stone called Palotte, the doorways being of Portland. The accommodation provided is shown by the complete set of floor plans of one of the houses, given above. Mr. Frank S. Chesterton, of 51, Cheapside, is the architect and Messrs. Daw & Son, of Palace Gate, are the lessees and builders.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Town Halls.

BIRMINGHAM.—H. W. S. writes: "Are the town halls at Bolton and Portsmouth replicas of Leeds Town Hall, and were they designed by the same architect?"

Portsmouth Town Hall, opened in 1891, is very much like Bolton Town Hall, opened in 1873, having been designed by the same architect, Mr. W. Hill. Leeds Town Hall was opened in 1853; Mr. Cuthbert Brodric was the architect. The other two resemble it somewhat in general mass, but the tower is quite different.

Drain under Building.

BILSTON.—G. H. P. writes: "My client has some old property and land under which runs a public drain which was at one time simply a ditch. The property has fallen into a bad state of repair, and my client now proposes to take down part of it and erect two small houses. Plans have been submitted to the local district council. The surveyor's attention being called to the drain, it was suggested the council should divert it or my client would arch over it and fill in with concrete. The surveyor writes 'that the council will not entertain the proposal to build over the sewer, neither can they consider any question as to diversion of the sewer that would entail cost to them, but the council would consider the matter if my client would undertake the cost of diversion.' The plans submitted were in accordance with the council's by-laws. What is our legal position in the matter? Can we force the council to either divert the drain or allow us to proceed?"

If—as I gather from your notes—the drain is an old one, the public have undoubtedly acquired an easement over your client's land, and you are only in a position to deal with the property subject to the right of passage for the drainage. The council are within their legal rights in asking your client to bear the whole of the cost of the contemplated diversion, and I advise you to accept their offer to pass the plans subject to this liability. Though the sewer at present passes under the old building, you will undoubtedly be barred from erecting a new building in such a position. F. S. I.

Water in Cellar.

COATBRIDGE.—A. M. M. writes: "In a basement cellar the walls of which are of 18in. rubble built in lime-mortar, and the floor-level about 3ft. below the street drain, water is coming through the wall and lies 3ft. deep in the cellar. I have already tried building a gin. brick wall in cement for 4ft. high around the inside of the cellar, keeping it 1½ins. clear of the rubble wall and filling in the cavity with liquid asphalt, but the water has burst it. What should I do to keep the cellar watertight? I cannot put puddled clay behind the walls without a great deal of inconvenience and expense. I may mention that there is no water coming through the floor, which is of 6in. concrete finished with 1½ins. Portland cement and granite chips in equal proportions."

I fear there is but little chance that the percolation of water will be entirely prevented by the internal wall of which you

speak. Were you able to afford drainage to the hollow (in place of the asphalt), I have no doubt your plan would have answered well enough. I can only suggest that you should lay an outside drain which will tap the water before it percolates the rubble wall, or in default of this you should provide a drain to the cellar itself. F. S. I.

Stresses in Roof Truss.

WOODFORD GREEN.—A. C. G. writes: "Can the stress diagram for the type of roof shown on the accompanying drawing (not reproduced) be worked out systematically, wind-pressure being neglected?"

This form of roof truss gives special difficulty because no direct stress diagram can be formed, but it has already been dealt with and fully explained on p. 442 of *THE BUILDERS' JOURNAL* for July 18th, 1900.

HENRY ADAMS.

A French Cement.

SOUTHALL.—C. H. writes: "Kindly give the name and address of a certain French firm who supply a cement of about double the strength of Portland."

We have not heard of such a cement.

Drawings required by Local Authorities.

LONDON.—H. B. writes: "Can local authorities claim elevations as well as plans and sections of buildings?"

The authorities only ask for drawings sufficient to explain the construction of a proposed building, and if in their judgment elevations are necessary to judge the hygienic efficiency and structural stability they must be supplied.

Pupil's Indenture.

BRISTOL.—A CONSTANT READER writes: "Where can I obtain an indenture form suitable for an architect's pupil?"

A form of indenture is published by the Royal Institute of British Architects, 9, Conduit Street, W., price 1s.

Liability for Smoky Chimneys.

CONWAY.—N. writes: "I have just built a house in which the chimneys have been well constructed in accordance with the plans, but owing to the situation there is a draught when windy. Chimney-pots have to be placed on the flues. At whose expense should this be done—the employer's, the builder's or the architect's? I have the usual clause as to all 'work being left fit for use on completion,' and the employer contends that while the chimneys smoke this is not so."

The expense should be borne by the employer. The builder had nothing to do with the design, and if he has worked to the plans he cannot be held responsible for anything which is wrong with the efficiency of the design in any way. The architect also cannot be held responsible for the extra expense, because he has exercised all reasonable care (the draught of a chimney being admittedly somewhat doubtful when the surroundings affect the wind-currents), and the same expense would have had to be entailed by the client if it could have been foreseen that the pots would have been required and included on the plans at the beginning of the contract.

White Rough-cast.

LONDON.—BARNET writes: "(1) It is proposed to coat the external walls of a new house with white stucco left with a rough surface, the first coat to be of Portland cement and sand 1 to 4, the second (and final) coat to be of 1 part Portland, 2 parts sand, and 1 part gravel of various degrees of coarseness, mixed with the water of chalk lime-putty to obtain the whiteness, and thus avoid having to colour the stucco after fixing. Is this the best method? (2) Should the stucco be

rendered from the top of the footings or from the damp-course?"

(1) The method proposed is a fairly good one. When there is no special reason, one coat is generally adopted, but if the rough-cast is depended upon to make the walls damp-resisting, two coats are advisable, the first consisting of 2 of sand and 1 of cement. In this case it seems advisable to use only one coat composed of 1 part Portland cement, 1 part white aggregate (such as silver sand, Bath stone dust, white marble sand or white spar—the last two for preference), 1 part shingle and 1½th part well-sifted powdered whiting. The last may be omitted if a particularly white coat is not desired. (2) There is no need to go below the damp-course, except for reasons of harmonious architectural effect. It is quite unnecessary to go below the ground level down to the footings.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.

IN his presidential address to the Leeds and Yorkshire Architectural Society last Thursday, Mr. Bulmer said with regard to the new Roman Catholic Cathedral at Leeds that the architect, Mr. Eastwood, had made the most of a restricted site as regards the plan, and externally had succeeded in giving a cathedral character to his design in spite of its limited dimensions. Although it was thoroughly Gothic in conception, it was full of original thought in detail. Another important work opened during the year was the Kirkgate Market. As a practical architect he could not but consider that the promoters might have paid a large fee to a consulting architect and been much in pocket by the transaction. If the oft-repeated details carved in stone had been reproduced in terra-cotta, a great saving would have been made, whilst retaining the general richness of effect. A judicious use of the pruning knife amongst the lead ornamented mansards, turrets, pinnacles, domes, &c., forming the roof would have had a similar result. The money so saved could have been expended with more telling effect in the centre of the city. The completion of these and other buildings naturally led them to thoughts of those which were to come. It might be that a new art gallery, natural history museums, and possibly a block of law courts, to relieve the congestion of the present buildings, would be required, and in this connection he pleaded for a due consideration of their positions, so that each might reinforce the others. It was much to be desired that these matters should be carefully thought out by a strong committee assisted by a competent architect, and not be left to the advice of a surveyor. The Town Hall Square was a monument of incompetence, and should be taken in hand, unless the Town Hall was to remain standing in a howling wilderness. There were three more areas which would have to be dealt with—that formed by the widening of the road at the bottom of Cookridge Street being the most important. Here was an opportunity for the skill of the surveyor in providing levels for the tramways and for the architect in devising a building scheme. Referring to architects' registration, he said they desired to obtain protection for those who had spent time and money in educating themselves from the encroachments of "that curious medley of persons who to-day call themselves architects." They would protect them from the empiric, the quack and the Pecksniffs who surrounded them. They would lay the architectural ghost and scotch the architectural imposture.

The twenty-ninth annual report of the Society states the membership to be 155. A silver badge of office, to be worn by the president, has been executed by the Bromsgrove Guild of Applied Arts.

JUNIOR INSTITUTION OF ENGINEERS

Municipal Engineering on the Continent.

THIS was the title of the presidential address which Mr. W. H. Lindley, M.I.C.E., F.G.S., delivered last Friday to the Junior Institution of Engineers. He divided his subject under four heads, namely, (1) waterworks, (2) sewerage works, (3) electric lighting, and (4) various works, such as harbour works, extension of towns, &c.; and he based his address to a great extent on the personal experiences of his father and himself, as they had stood for the last sixty years in the midst of this development.

Waterworks.

Mr. W. H. Lindley explained how the first works for water-supply, as well as the first sewerage works, were those of the city of Hamburg. They were designed and carried out by his father, William Lindley, after the great fire of 1842, under the influence of English works of a similar nature. He showed how this influence continued in the works that were planned in the 'forties and 'fifties; the Berlin Waterworks designed by Mr. Moore in 1853-6 and the Altona Waterworks designed by Mr. Thomas Hawkesley in 1857-9. He then went on to show the gradual development of these works, due to the utilization of the special sources of supply available on the Continent, firstly, from underground water in Leipzig in 1858-65 and subsequently in 1877-84; secondly, similar works in Halle in 1867-9 and in Dresden in 1870-74; and thirdly, the works of the same nature designed by William Lindley in 1868 for the supply of Düsseldorf.

He described the Berlin Works, commenced in 1874-7 by Mr. Henry Gill for the water supply with ground water from the banks of the Lake Tegel, and the extensions of these works up to fifty-seven million gallons a day, with a filter area of 1,600,000 sq. ft. He showed how the difficulties caused by the iron in the ground water found in the great northern German plain were gradually overcome by various systems of deferrization.

Mr. Lindley then went on to describe the works carried out by himself for the supply of Frankfort-on-Maine with ground water collected in the city forests.

Sewerage Works.

Dealing with these, he gave a brief description of the former state of drainage in Continental cities by means of street gutters, ditches and old sewers. He likewise showed how the great fire of Hamburg in 1842 gave the first impulse for systematic drainage, and how for twenty years Hamburg remained the only city in Germany with a complete system of sewers.

In 1863-5 Frankfort followed suit, the egg-shaped section being adopted; stoneware invert and junction blocks and pipes came into use. One of the chief characteristics of this system was the considerable depth at which the sewers were laid, namely 15ft., thus permitting the house drains to be carried out beneath the cellars. The system had spread over the south and west of Germany, being carried out largely under the direction of his father and himself. In Frankfort and the South German towns the connection of the water-closets to the sewers, adopted in Hamburg without difficulty, met with great opposition on grounds of the agricultural value of the excrementous matters and the hygienic side of the question. Another system began with the Danzig sewers, carried out to the designs of Mr. Wiebe and Mr. Baldwin Latham in 1872-3; and Berlin commenced in 1876 on the plans and under the direction of Mr. Hobrecht. This system was specially suited to the conditions of the great northern German diluvial plain, with difficult outfall conditions, demanding pumping and

irrigation, the subsoil water, being near the surface, not admitting sewers of great depth. This system consists of small pipe sewers joining in manhole shafts at the corner of streets and discharging into main sewers leading to a pumping station or pumping stations.

Speaking of disposal works, he drew attention to the spread of those for precipitation, and the position of the biological system which has latterly been adopted on the basis of English experiments.

Electric Lighting.

The commencement of supplying towns with electric energy was made by the Berlin works in 1885, which have now attained a capacity of 61,000 kilowatts, producing 100,000,000 kilowatt hours per annum. These works were followed by Elberfeld in 1887, the first municipal electric supply station. Both these stations were on the continuous-current system. Mr. Lindley proceeded to describe the Frankfort works, first designed by him in 1889, when Professor Kittler and himself proposed the adoption of the alternating current. The great fight which ensued between continuous and alternating current gave rise to the Electrical Exhibition in 1891 in Frankfort, and only after a controversy of 4½ years was the alternating current adopted by the city authorities.

The Elberfeld works were next described, the most interesting feature being the adoption of the Parsons steam turbine in large units of 1,250 kilowatts; at these works the expenses (interest on capital and sinking fund excluded) per kilowatt hour supplied have been brought down to 7d. and the coal consumption per kilowatt hour reduced to 2·65 lbs.

Divers Works.

In conclusion Mr. Lindley gave a short account of river works, and especially harbour works at Frankfort, and then alluded to the systematic laying out of plans for the extension of towns adopted in Germany, mentioning the works of Mr. Stubben in Cologne and Mr. Baumeister in Carlsruhe and Mannheim. He drew attention to the fact that while at the commencement of the period he had spoken of, municipal engineering on the Continent stood generally under ideas derived from England, and even to-day was so on certain special subjects, such as the purification of sewage and the destruction of refuse, a very great and independent development had gone on, and it would be of great value for English engineers occupied in municipal works to study and follow up what was being done, and therefore such visits like those paid by the Institution to the Continent could only be productive of valuable results.

Correspondence.

"Ventilation."

To the Editor of THE BUILDERS' JOURNAL.
BIRMINGHAM.

SIR,—Thanking you for the excellent report of my paper on "Ventilation" in your last issue, may I be permitted to point out that I am not quite correctly quoted in the "Summary" on p. 255.

I have never stated that walls "should on no account be made impervious unless some mechanical system of ventilation is adopted." What I did say is correctly reported on p. 263, namely, that "unless ample provision were made for permitting continuous change of air in a room, nothing could be worse than constructing all walls, floors and ceilings of impervious materials," &c. This in no way implies that a mechanical system of ventilation is a necessity, although occasionally, under particular circumstances, such might be advisable.—Yours truly,

WILLIAM HENMAN.

L.C.C.

THE report of the Building Act Committee at yesterday's meeting of the London County Council referred to the interpretation of a clause under the Building Act. In April, 1904, their attention was drawn to the erection by Mr. J. H. Heathman of buildings at the rear of No. 10, Parson's Green, Fulham, abutting upon a private road in such a manner as to constitute, in their opinion, the formation of a street or the adaptation of a way as a street. As the consent of the Council had not been obtained thereto, summonses were taken out. At the hearing of the summonses, the defendant stated that he had no intention of forming a street when erecting the buildings, and contended that the case consequently came within the proviso contained in section 8 of the London Building Act, 1894, which provides that "no person shall be deemed to commence to form or lay-out a street if he do any of the acts in this section mentioned for some purpose other than that of forming or laying out a street." This contention was upheld by the magistrate, and the summonses were dismissed. In view of the importance of the principle at issue, the magistrate was asked to state a special case, and did so, and this has been set down in the High Court for hearing.

The Committee saw no objection to the following applications being acceded to:—

A one-storey lavatory addition in front of No. 62, Portland Place, St. Marylebone, to abut upon Weymouth Street, submitted by Mr. H. Lake on behalf of Mr. W. Tebb.

An iron and glass hood in front of No. 23, Roland Gardens, Kensington, submitted by Mr. W. Willott on behalf of Mr. J. B. Ellison.

A gas-meter house at Beaufort House Schools, Lillie Road, Fulham, submitted by Mr. T. J. Bailey on behalf of the Education Committee of the Council.

An additional storey to No. 35A, Great Cumberland Place, St. Marylebone, submitted by Mr. R. G. Hammond on behalf of Mr. F. Dugdale.

Obituary.

Mr. H. Muir, builder, of Saltcoats, died last week in his seventy-second year.

Mr. W. H. F. Sames, of Messrs. Sames & Green, architects, Blackburn and Darwen, died recently, aged 40.

Mr. C. Foulsham, architect, of Kentish Town, who died on October 28th, aged 67, left estate which has been valued at £27,759.

Mr. William Moulson, once mayor of Bradford, died last week, aged 79. He was head of the building firm bearing his name, and carried out many important contracts, including a great portion of the late Sir Titus Salt's works and town of Saltaire, the great pile of factories and combing-sheds in Springmill Street for the late Sir Henry Rip ey, the works of Messrs. Mitchell Brothers, and Horton Lane Chapel and Schools. In 1876 Mr. Moulson took his sons Angus and Rufus into partnership, and about ten years ago the firm was joined by two other sons—John and Archibald—when Mr. Moulson himself retired from the business. He was twice married.

Mr. John Norton, F.R.I.B.A., of Bourne-mouth, died recently in his eightieth year. He won the first prize at the London University classes in 1848, occupied the presidential chair in the early days of the Architectural Association, and was elected Associate of the Royal Institute in 1850 and Fellow in 1857. He served as a member of council of the Institute and of the Artists' General Benevolent Institution. The Arundel Society was greatly indebted to him, for he was its hon. secretary during the whole of its existence. Mr. Norton was responsible for more than thirty new churches and fifty restored and rebuilt churches; also many country mansions. Mr. C. Harrold Norton carries on his father's practice.

Complete List of Contracts Open.

DATE OF DELIVERY.		WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING :				
Nov.	24	Acton—School	Urban District Council	E. C. P. & H. Monson, Grosvenor House, Acton Vale, W.
"	24	Bradford—Printing Works and Shops	—	A. Sharp, Pearl Assurance Buildings, Market Street, Bradford.
"	24	Manchester—Shelters	Parks Committee	City Architect, Town Hall, Manchester.
"	25	Crawfordsburn—House	Colonel Sharmun-Crawford	S. G. Hunter, Scottish Provident Buildings, Belfast.
"	25	Alnwick—Infirmary	Governors	W. T. Hindmarsh, 26 Bondgate Without, Alnwick.
"	25	Ingoldmells, Lincs—Coastguard Buildings	—	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
"	25	Lowestoft—Reserve Establishment	—	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
"	25	Nelson, Lancs—Fish, &c., Market	—	Mr. Ball, Borough Surveyor, Nelson.
"	25	Peel, Isle of Man—Coastguard Buildings	—	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
"	25	Rotherham—Wall	—	Borough Surveyor, Rotherham.
"	25	St. Peters, Lincs—Coastguard Buildings	—	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
"	25	Batley, Yorks—Six Houses	—	H. B. Buckley, 85 Commercial Street, Batley.
"	25	Merthyr Tydfil—Fire-Escape Staircases	—	T. Roderick, Merthyr Tydfil.
"	25	Dolgelly—Additions, &c., to Men's Ward	—	R. G. Jones, Bank Buildings, Dolgelly.
"	25	Aberystwyth—House	Captain Hughes	Captain Hughes, "Fells," Caerlog Terrace, Aberystwyth.
"	26	Carrick-on-Suir, Ireland—Sanitary Annexes	—	J. Mullins, Clerk, Carrick-on-Suir.
"	26	Burnham Market, Norfolk—Improvement to Offices	Education Committee	Rev. E. Kynaston, Burnham Market.
"	28	Newcastle-on-Tyne—Schools	Governors	H. J. Criddle, Northern Assurance Buildings, 2 Collingwood Street, Newcastle.
"	29	Grange-over-Sands—House	Mr. W. Dalglish	Settle and Brundrit, Architects, Ulverston.
"	29	Penally, Pembrokeshire—Alterations to Buildings, &c.	Great Western Railway Co.	Engineer, Neath Station.
"	29	Avonmouth, near Bristol—Goods Shed	Great Western Railway Co.	Engineer, Bristol Station.
"	30	Beetham—Alterations, &c., to Hotel	C. Frith-Hudson, Esq., J.P.	S. Shaw, Kendal.
"	30	Altrincham—Cottages	Urban District Council	Town Hall, Altrincham.
"	30	Fellcliffe, near Harrogate—Repairs to School	Education Committee	Offices, West Riding County Council.
Dec.	1	Carmarthen—Repairs to Schools	Education Committee	W. D. Jenkins, Shire Hall, Carmarthen.
"	1	Goodwick—Plastering Mansion	Colonel Parter	D. Nicholas, Builder, Goodwick.
"	1	Stamford—Children's Homes	Guardians	J. Ward, Architect, Stamford.
"	2	Greenock—Gunners Instruction House	—	Superintending Engineer, H.M. Naval Establishment, Rosyth, Inverkeithing.
"	3	Selly Oak, near Birmingham—Public Baths	Urban District Council	A. W. Cross, 23 Valentine Road, King's Heath, Birmingham.
"	4	Sunderland—Board Room, &c.	Commissioners	Henderson & Hall, 28 John Street, Sunderland.
"	5	Handsworth, Staffs—Public Baths	Urban District Council	J. P. Osborne, 95 Colmore Row, Birmingham.
"	5	Camberley—Council Offices	Frimley U.D.C.	Council Offices, High Street, Camberley.
"	5	Hereford—School	Education Committee	E. N. Barker, 146 Owen Street, Hereford.
"	5	Edinburgh—City Hall	Corporation	Public Works Offices, City Chambers, Edinburgh.
"	6	Leytonstone—Alterations to Schools	Urban District Council	W. Jacques, 2 Fen Court, Fenchurch Street, E.C.
"	7	East Cowes—Engine House	Urban District Council	A. Damant, Council Offices, Cowes.
"	7	Walthamstow—Tramway Offices	Urban District Council	G. W. Holmes, Town Hall, Walthamstow.
"	8	London, E.—Enlargement of Post Office	Commissioners	J. Wager, H.M. Office of Works, Storey's Gate, S.W.
"	12	Sunderland—General Offices, &c.	River Wear Commissioners	Henderson & Hall, 28 John Street, Sunderland.
"	20	Lambeth—Conversion of School into Home	Guardians	W. Thurnall, Clerk, Guardians' Offices, Brook Street, Kennington Road, S.E.
Jan.	4	Buxton—Milnthorpe Homes	—	W. R. Bryden, F.R.I.B.A., Buxton.
"	4	Felixstowe—Coach-house	W. G. Clarke	H. W. Buxton, 26 Hamilton Road, Felixstowe.
"	4	Dewsbury—Wesleyan Sunday School	—	Danby & Simpson, 73 Albion Street, Leeds.
"	4	Radcliffe-on-Trent—Shops	Co-operative Society	Calvert & Gleeve, Low Pavement, Nottingham.
"	4	Long Eaton—Ten Houses	—	E. B. Ridway, Main Street, Long Eaton.
ENGINEERING :				
Nov.	24	Sparkhill, near Birmingham—Distributing Carriers	Yardley Rural District Council	A. W. Smith, Council House, Sparkhill.
"	24	Sparkhill, near Birmingham—Sewerage Works	Yardley Rural District Council	A. W. Smith, Council House, Sparkhill.
"	24	Ashford, Middlesex—Lining Water Tanks	Managers of W. London School District.	F. G. Beeching, Clerk to Managers, Ashford.
"	26	Glasgow—Electric Lighting	Governors of West of Scotland Technical College.	F. H. Stockdale, 38 Bath Street, Glasgow.
"	26	Leith—Tramway Cars	Corporation	T. B. Laing, Council Chambers, Leith.
"	27	Dundee—Covering for Pipes	Harbour Trustees	J. Thompson, Harbour Engineer, Dundee.
"	28	Sunderland—Generators	Corporation	John F. C. Snell, M.I.C.E., Town Hall, Sunderland.
"	28	Walthamstow—Heating	Urban District Council	G. W. Holmes, A.M.I.C.E., Town Hall, Walthamstow.
"	28	London, E.C.—Steam Motors	Agent-General for S. Australia	Offices, Threadneedle House, Bishopsgate Street Within, E.C.
"	29	London, N.—Laundry Machinery	Hornsey Town Council	E. J. Lovegrove, Borough Engineer, Municipal Offices, 99 Southwood Lane, Highgate, N.
"	30	Hanley, Staffs—Pipe Trench	Potteries Waterworks Co.	G. D. Harrison, Albion Street, Hanley.
"	30	West Hartlepool—Filling in Arches	Corporation	N. F. Dennis, Borough Engineer, West Hartlepool.
Dec.	3	Oswestry—Motor Vehicles	Cambrian Railways Co.	E. H. Jones, Locomotive Superintendent, Oswestry.
"	3	Brentwood—Pump	Essex County Asylum	Medical Superintendent, Brentwood Asylum.
"	5	Edinburgh—Heating and Ventilation	Corporation	Public Works Office, City Chambers, Edinburgh.
"	6	Llandilo, Wales—Testing Electricity Meters	Urban District Council	R. S. Lewis, Clerk, Llandilo.
"	7	Johannesburg—Cranes	Municipal Council	Mawdey and Dawbarn, 82 Victoria Street, S.W.
"	7	Johannesburg—Transformer Pillars	Municipal Council	Mawdey and Dawbarn, 82 Victoria Street, S.W.
"	7	E. Cowes, Isle of Wight—Water Tower	Urban District Council	A. Damant, Council Offices, Cowes.
"	7	E. Cowes, Isle of Wight—Engine, &c.	Urban District Council	A. Damant, Council Offices, Cowes.
"	7	E. Cowes, Isle of Wight—Main from Waterworks	Urban District Council	A. Damant, Council Offices, Cowes.
"	8	Perth, Australia—Telephone Material	—	General Post Offices, Perth, Adelaide, Melbourne, Australia.
"	14	Malines—Bridges	—	La Bourse de Commerce, Brussels, Belgium.
"	20	Bangor, Wales—Meters	Urban District Council	B. Mitchell, Bangor.
"	21	Cardiff—Pumping Machinery, &c.	Corporation	W. Harpur, Borough Engineer, Cardiff.
"	31	London, S.E.—Electric Bells, &c.	Camberwell Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
Jan.	23	Epsom—Hot-water Plant, &c.	Asylums Committee	Clerk to Committee, 6 Waterloo Place, S.W.
"	28	Giurgevo, Roumania—Electric Light	—	Municipal Offices, Giurgevo.
April	1	Lulea, Sweden—Dredging	—	Harbour Office, Lulea, Sweden.
IRON AND STEEL :				
Nov.	24	West Ham—Iron Coal Bunker	Guardians	Clerk's Office, Workhouse, West Ham.
"	26	Mountmellick—Iron Cistern	Guardians	J. Bannan, Clerk of Works, Maryborough.
"	26	Harrogate—Cast-iron Pipes	Corporation	E. W. Dixon, 1A Cambridge Crescent, Harrogate.
"	26	Leith—Rails, &c.	Corporation	T. B. Laing, Town Clerk, Leith.
"	28	Exmouth—Wrought-iron Railings	—	S. Holton, Exmouth.
Dec.	5	London, S.E.—Steel Rails, &c.	Camberwell Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
PAINTING AND PLUMBING :				
Nov.	28	West Hartlepool—Painting outside of Cottages	Corporation	N. F. Dennis, Borough Engineer, West Hartlepool.
"	29	Leeds—Painting Baths	Corporation	City Engineer, Leeds.
"	30	Harrogate—Colouring, &c.	—	Royal Bath Hospital and Convalescent Home, Harrogate.
Dec.	5	London, S.E.—White Lead, &c.	Camberwell Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
No date		Irthlingborough, Northants—Repairs, &c., to Cottages	—	J. S. Mason, High Street, Rushden.
ROADS AND CARTAGE :				
Nov.	24	Gateshead—Paving	Corporation	N. P. Pattinson, Town Hall, Gateshead.
"	24	London Fields—Asphalt Paving Works	Hackney Borough Council	N. Scorgie, Town Hall, Hackney.
"	24	Birmingham—Materials	County Council	J. Willmot, County Surveyor, Birmingham.
"	25	Worcester—Asphalt Paving	Corporation	C. Caink, City Engineer, Guildhall, Worcester.
"	25	Ystalyfera, Wales—Road	—	S. S. Hodgson, Yniscedwyn Estate Office, Ystalyfera.
"	26	New Malden—Making-up Roads	Urban District Council	Council Offices, New Malden.
"	29	Whitstable, Kent—Road Materials	Urban District Council	Surveyor to U.D.C., Whitstable.
"	29	Swansea—Street Works	Corporation	Borough Surveyor, 13 Somerset Place, Swansea.
"	30	Hove—Kerbing and Channelling	Town Council	Borough Surveyor, Town Hall, Hove.
Dec.	1	Hartlepool—Terrace Works	Corporation	H. C. Crummack, Borough Engineer, Hartlepool.
"	5	Camberwell—Flints, &c.	Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
"	5	Romford—Kerbing Works	Rural District Council	G. Lapwood, Victoria Road, Romford.
"	6	Leyton—Alterations to Road	Urban District Council	W. Jacques, 2 Fen Court, Fenchurch Street, E.C.

MONTHLY FIRE SUPPLEMENT

TO THE
BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.

Edwin O. Sachs, F.R.S.Ed., Architect,
Consulting Editor.

November 23, 1904.

SUMMARY.

The purpose of this supplement is not to fulfil a demand, for the public is apathetic, but to create a demand for regular information on the subject of fire protection and to assist in stimulating the interest due to the subject. (Page 1.)

A fire at a Glasgow warehouse emphasizes the true economy of fire-resisting construction when properly conceived and carefully carried out, and that with such construction the entire contents of a building may be destroyed without the carcase being materially affected. Concrete was the chief material employed. (Page 2.)

There are many materials on the market fictitiously called "fireproof." (Page 4.)

Terra-cotta floors and terra-cotta column protection failed disastrously at the great Baltimore fire. A photograph shows the remarkable effect of fire on some large granite columns and demonstrates the fallacy of trusting granite or stone where fire-resistance is concerned. (Page 7.)

The British delegates to the Budapest Fire Congress and to other large cities in Central Europe were handsomely welcomed, and much useful information was gathered. (Page 14.)

The Toronto fire showed the great danger from elevators and open stairways or well-holes in the communication of fire from floor to floor. The necessity of walls adjoining other properties being unpierced by openings was emphasized. (Page 8.)

Tall buildings and factory risks will probably be the subject of a Select Committee of the House of Commons. (Page 16.)

The temperatures at great fires are not such as to melt the materials set up against them. (Page 11.)

New theatre regulations at Liverpool have been issued. (Page 14.)

The petroleum blaze at Antwerp was due to the explosion of an oil tank. (Page 12.)

At the Carlisle Theatre fire there was no sprinkler in connection with the asbestos curtain. The proscenium stood the fire for some time, but gave way eventually. (Page 2.)

A fire test on "Kulm" slabs held recently showed no buckling nor cracks in the partition, although the temperature was over 1,800 degs. F., and fire and smoke did not pass through. The application of water had little effect. (Page 10.)

Fire protective legislation for buildings in different occupancies is difficult. The danger of such buildings was emphasized by the celluloid fire in Paris. (Page 13.)

OUR POLICY.

The Public Apathetic. WHEN a journal essays some new departure it is a general rule for the editor to attribute this to a desire to fulfil some existing demand. We, however, in arranging this new supplement to THE BUILDERS' JOURNAL do not wish it in any way to appear as if we thought these extra pages were fulfilling an existing demand. Quite the reverse. We do not believe that there is any demand among architects, surveyors and builders as a whole for information regarding fire protection. The few architects, surveyors and builders interested in the subject are still very much the exception. Owing to that quaint conservatism which has long distinguished both the professional man and the typical contractor of the metropolis, there has been a very curious apathy in respect to the fire question, except in a few individual instances, and except, perhaps, spasmodically for a short period after some great catastrophe.

To lead: Not to Follow. THE object of this Supplement is thus not to fulfil a demand, but to create a demand for regular information on the subject of fire protection and to assist in stimulating the interest due to the subject, but which has hitherto not been accorded it, so that in time the facts we present may actually be looked upon as an absolute necessity for any intelligent architect, surveyor or contractor.

To Stimulate Interest. WE wish to stimulate interest in everything appertaining to fire protection which concerns the building world directly or indirectly, because we are convinced that the great technical problem of the next few decades is to erect buildings with due regard to fire resistance, and to equip them with the view of preventing fires and also to extinguish these rapidly when they occur.

The Contents. As to the contents of the impending Supplements, we do not present a programme; we simply undertake to give reports or records of important fires and the lessons they teach, together with such general information on fire matters as may be of value.

Expert Assistance. IN obtaining our information we shall attempt to get it from the very best and most reliable sources, and we shall have expert advice of high order to assist us in the true presentation of facts.

Independence. WHEN we give opinions, we trust that they will be unbiased: they will certainly be of an independent character, governed by no considerations other than those of utility for our readers, even if these opinions are sometimes not as orthodox or as insular as is generally expected by the older generation.

Scope. ALTHOUGH, of course, precedence will always be accorded to matters of building and construction and to the equipment of buildings, we consider insurance and fire-brigade matters to be within the scope of our Supplements; and remembering the number of readers we enjoy in the civil engineering profession, the civil engineering aspect of fire protection will from time to time be referred to.

Essentially Practical. THE Supplement is to be essentially a practical one.

It is intended for those who fully appreciate the importance of construction, of building legislation and of business management in the modern development of a city, and for those who understand that true economy in building includes economic protection against fire loss, and also includes such measures as, we trust, will in time command favourable consideration from the insurance world.



HER MAJESTY'S ROOM, SANDRINGHAM.

SOME NOTES ON THE CARLISLE THEATRE FIRE.

IN describing fires a descriptive article is not always quite in place; yet the primary points may be of interest. We consider this to be the case with the Carlisle Theatre fire of September last, the following notes on which are instructive.

The building was erected in 1877. The enclosing walls were of brick and stone, the roof and ceiling over auditorium and annexes of wood construction, the roof slated, ceiling plastered, with a gas "sunlight" in the centre of the ceiling.

There were two tiers, each of wood construction, supported by cast-iron columns carried up from the ground floor, which was also of wood. An 18in. wall was built across the proscenium from below the ground level and carried through the roof. The width of the proscenium opening was 26ft., and the height 20ft. 6ins., being fitted with a double-lined "fireproof" asbestos curtain of modern construction. There was no sprinkler. Two other openings, each fitted with "fireproof" doors (self-closing), were in the proscenium. The stage roof was flat and formed of wood joists and boarding covered with lead. It was about 12ft. above the auditorium roof and was ventilated by louvred openings in the sides and by a manhole in the top with lifting cover.

Four exits were provided, including one emergency exit from the first tier (dress circle and side boxes) and one exit from the second tier (gallery) by a staircase 12ft. wide.

The outbreak occurred about 4 o'clock in the morning on September 15th last, but the cause of it is unknown.

The fire appliances included hydrants on the ground floor, first floor and stage, and also in the corridor to pit stalls on ground floor and on flies over stage.

Only one fireman was kept on duty in the building during performances.

The extent of the damage done was about £6,000. The fire commenced in the auditorium (in the roof, it is supposed).

The proscenium withstood the fire for some time, but eventually gave way, thus involving the stage behind. The front portion of the premises was saved by the existence of substantial walls and the efforts of the fire brigade.

Bale Theatre Fire.—Since the Carlisle fire the Bale Theatre has been destroyed by fire. It had some architectural pretensions,

SANDRINGHAM.

THE King and Queen have been staying at Sandringham, where various alterations and improvements have been made since the fire occurred in the Queen's bedroom, which might have ended so seriously for Her Majesty. Sandringham is well equipped with fire-extinguishing appliances, and the staff is duly trained to meet emergencies. We trust that the fire preventive side has now also been sufficiently dealt with so as to avoid the possible recurrence of such risks as those of a bedroom fire through defective construction. By way of reminder we give a photograph of the Queen's room, as well as one of the Hon. Miss Knollys's room, situated just above it. Both views were taken directly after the fire which occurred. Miss Knollys recently most deservedly received a token of appreciation from an Australian Fire Brigade for the services rendered on this occasion.



THE HON. MISS KNOLLYS'S ROOM, SANDRINGHAM.

THE BUCHANAN STREET FIRE, GLASGOW.

THE fire which occurred in Buchanan Street on November 6th last year will be remembered as one of the most interesting of Glasgow fires from a technical point of view. Some drawings and photographs of it are here reproduced and should prove eminently instructive. We know of no instance in Great Britain where there has been such an excellent example of what careful fire-resisting construction will do in preventing the wreckage of a building, no matter how inflammable its contents. From the insurance standpoint this fire simply meant re-roofing and re-insatatement. The carcase and all the more important constructive features remained intact.

Regarding the actual history of the fire, the fire brigade received a call at 9.4 p.m. through the agency of an ordinary electric fire-alarm call point in Princes Square. Two minutes later another call reached the brigade. At 9.7½ p.m. an automatic fire-alarm situated in the warehouse of Messrs. Wylie, Hill & Co. indicated that these premises were alight. The actual fire had occurred in the first instance in the building of Messrs. Brown, Smith & Co., No. 14, Buchanan Street, and had then spread to the extensive premises of Messrs. Wylie, Hill & Co., from which they were separated only by a passage 10ft. wide, the windows being in no way protected against the spread of fire. The first-named building had a frontage of 32ft. and a depth of 95ft., comprising seven floors and a basement, and was used by wholesale millinery and woollen firms. Messrs. Wylie, Hill & Co.'s premises comprised six floors and a basement, and had a frontage of 60ft. with a depth of 95ft.; they were entirely in one ownership, and were used exclusively for the fancy-goods business. Both blocks were entirely burnt out; and whilst No. 14, Buchanan Street was gutted and wrecked, No. 20, Buchanan Street (which we illustrate) remained practically intact: it was only stripped of its contents, fittings and decorations, and had its plaster surfaces impaired. We would call particular attention to the manner in which all columns and girders were duly protected, and to the fact that the staircase was of concrete. If the owners had had the same intentions for safe building at a later date



BEFORE THE FIRE



AND AFTER.

as when the block was erected, there would probably have been better forms of protection employed so far as the columns were con-

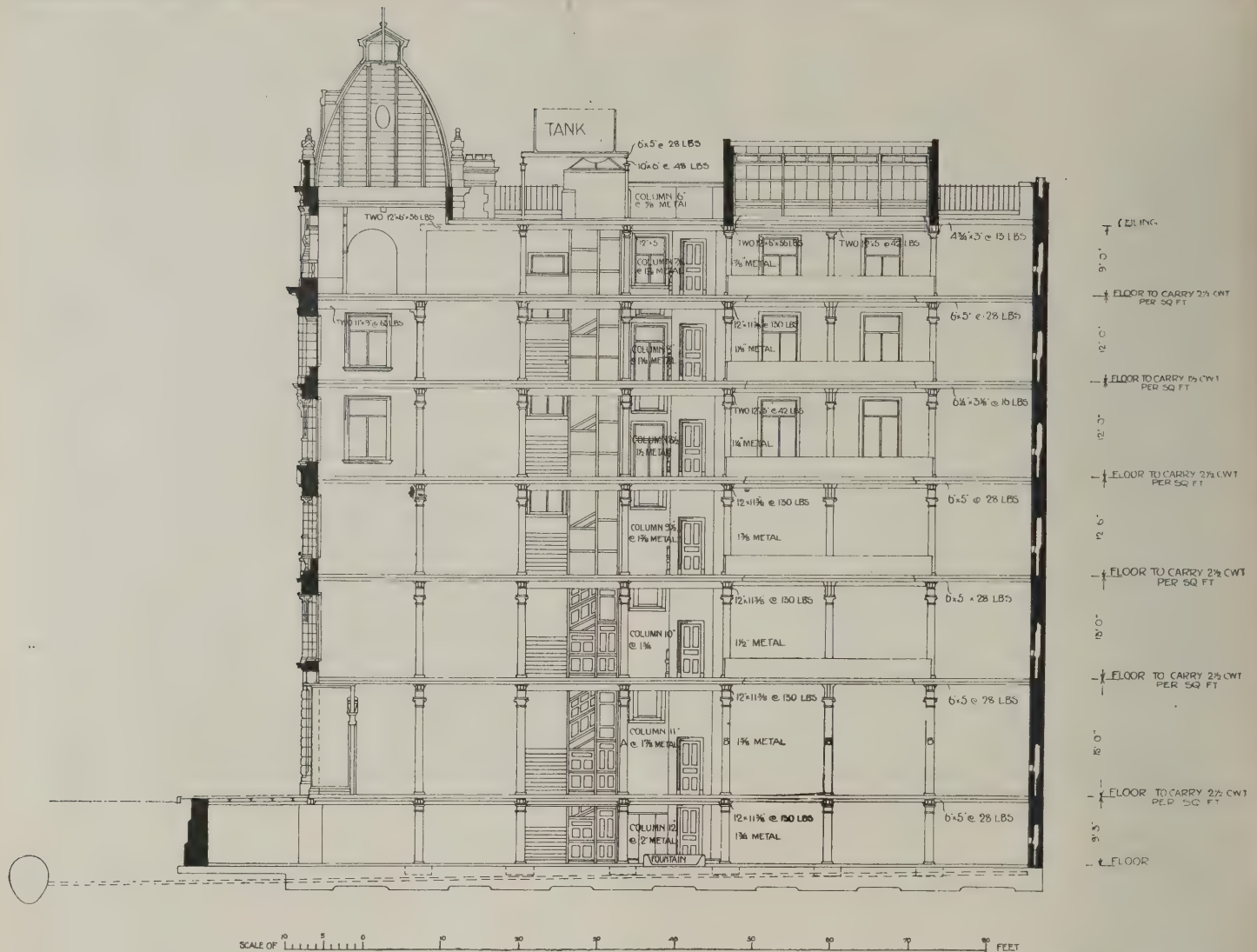
cerned, but such protection as was accorded in this instance was found to be fairly efficient.

Of actual details it is interesting to note that the floor girders were 6 ins. deep and had five flanges spaced about 2 ft. 9 ins. centre to



VIEW OF GROUND FLOOR.

THE FIRE AT THE WAREHOUSE OF R. WYLIE HILL AND CO., LTD., BUCHANAN STREET, GLASGOW.



LONGITUDINAL SECTION OF THE WAREHOUSE OF R. WYLIE HILL AND CO., LTD., GLASGOW. JOHN HUTCHINSON, F.R.I.B.A., ARCHITECT.

to centre, covering 12ft. spans. Some very effective composite doors were used; they were by the Titancrete Co., Ltd., of Manchester, and comprised a skeleton of iron bars

with a covering of wire of $1\frac{1}{2}$ in. mesh filled in with a plastic composition.

The Glasgow by-laws insist upon all steel-work carrying the front of a building being

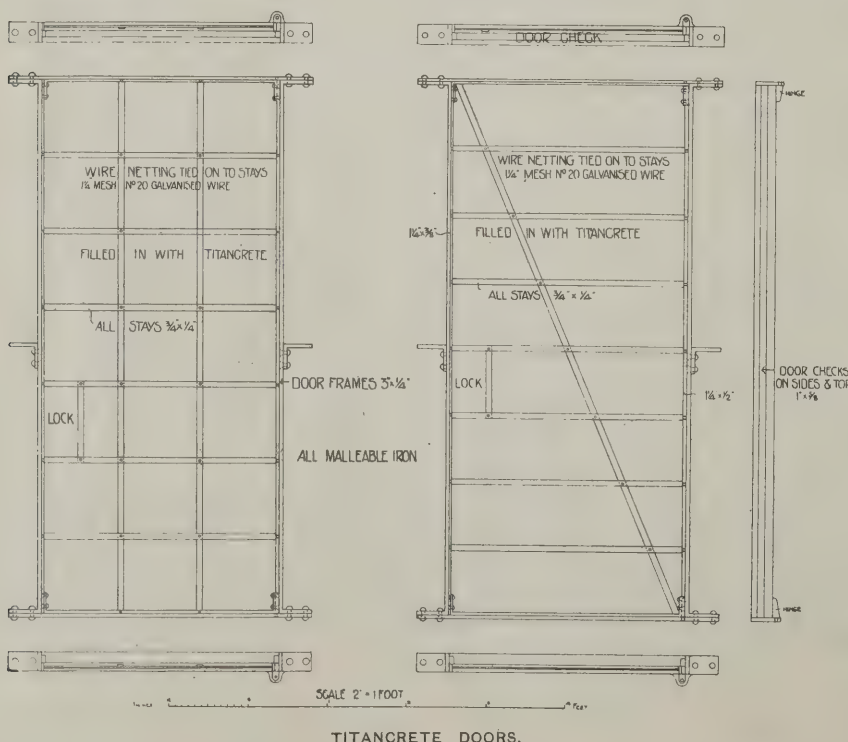
protected by steel lathing and concrete or plaster. In the alterations and repairs to this building all the steelwork has been covered with "expanded metal" lathing and plaster.

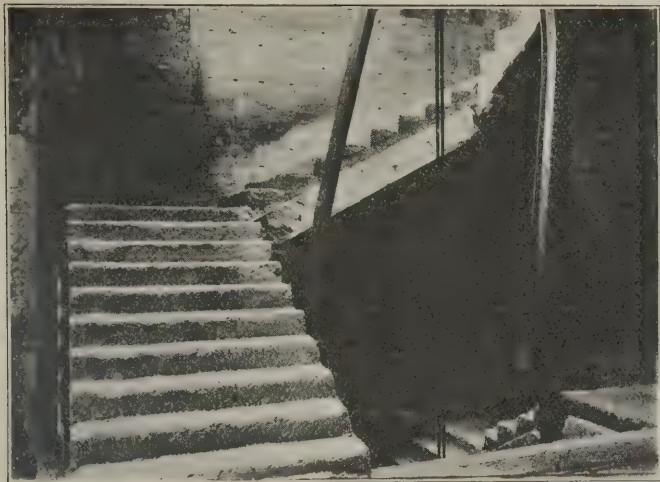
We cannot but again emphasize that this fire was an excellent example of the true economy of fire-resisting construction when properly conceived and carefully carried out, and that with such careful and reliable construction the entire contents of a building may be destroyed without the carcase being materially affected.

FICTITIOUS FIREPROOF MATERIALS.

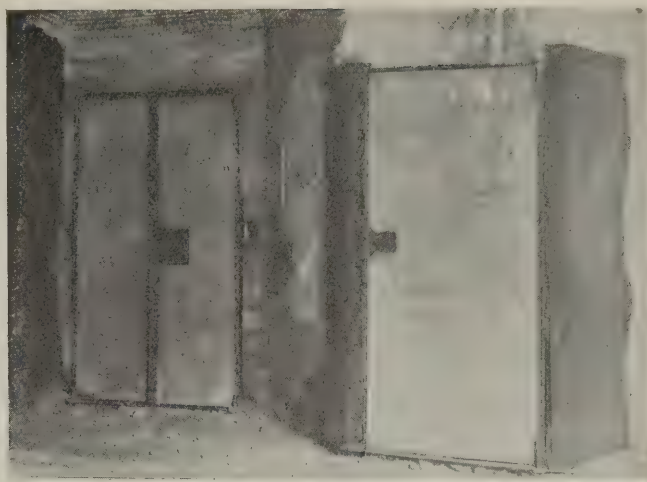
A LEADING article of the greatest importance was published recently by our contemporary "Engineering" dealing with the very serious problem of putting a stop to the sale of fictitious so-called "fireproof" materials. The subject is one that obviously demands the closest attention, as the manner in which the public and the architectural profession are gulled by ignorant or unscrupulous traders, who either dare not or will not allow their wares to be independently tested, has become a menace to building development in cities.

We are no great advocates of tests conducted by Government or municipal departments, where red tape and hard-and-fast rules frequently prevent reasonable and practical investigation. We have seen enough of water tests, gas tests and general analyses conducted by Government or municipal





THE CONCRETE STAIRCASE AFTER THE FIRE.



THE COMPOSITE DOORS AFTER THE FIRE.

departments to be sometimes sceptical as to their practical value. We believe in independent investigation conducted by men who are representative of the professions primarily interested, jointly with men representing the public and municipal departments concerned. We would suggest to manufacturers who have not submitted their goods to independent tests, because perhaps they have been supplying their materials for many years and have satisfied themselves as to their value that they not only run the risk of being misunderstood but that they are opening the door to unscrupulous traders who have no reputation to lose to claim exemption from what is really the greatest protection to the public interests. For our own part we shall endeavour to keep our readers supplied with only the most reliable information.

The article in "Engineering" was as follows:—

"It has long been apparent to those who take a serious interest in the question of fire prevention that one of the chief dangers in the development of building construction, from the fire point of view, is the general ignorance of the building employer, coupled with a very general apathy amongst architects and engineers. The result of this ignorance on the one side, and this apathy on the other, is a curiously unwarranted appreciation of any material or system of construction from which a showy effect can be obtained, inasmuch as these demonstrations apparently awaken a kind of thoughtless interest, which leads to the placing of orders of considerable bulk without due regard to the actual value of the article under consideration.

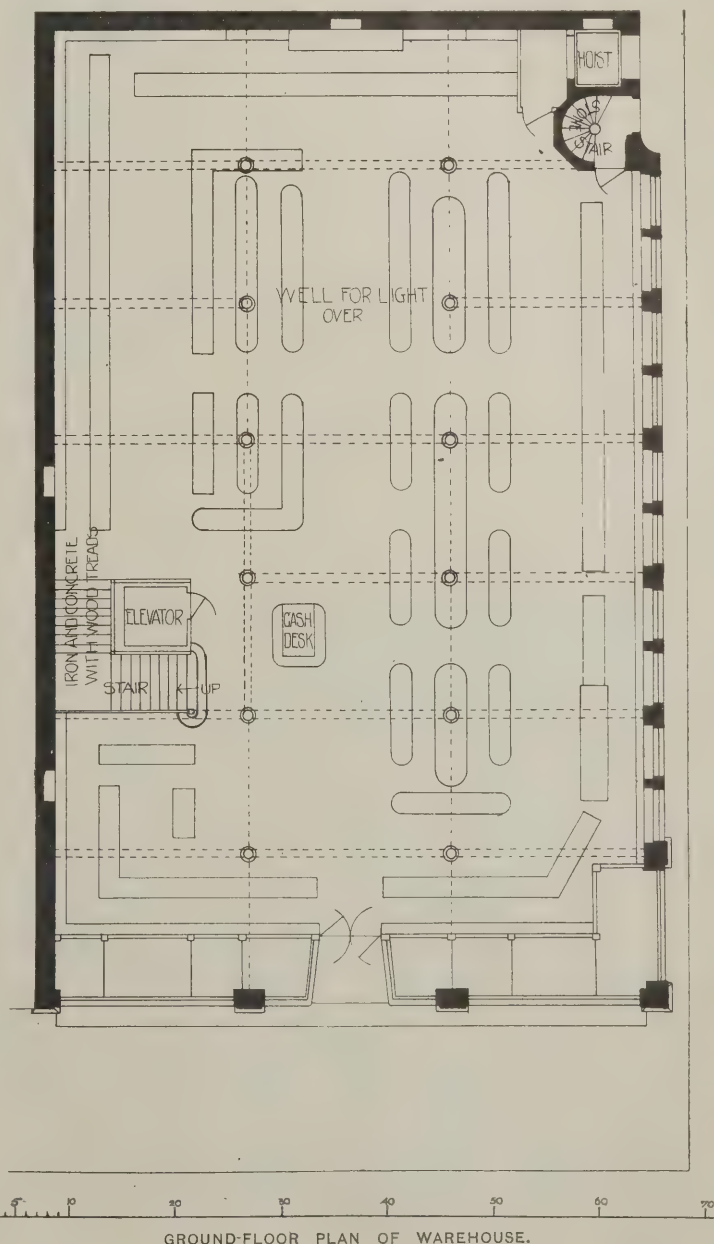
"We believe it to be due to the knowledge of this confiding nature of the general public, as well as that of many professional men in this special direction, that fire experts in different countries have tried their best to organize a series of investigations of a reliable character in which all make-believe should be abolished. In the United States, the Chicago Underwriters' Laboratories (under Mr. Merrill) and recently the Boston Experimenting Station (under Mr. Atkinson, Professor Norton and Mr. Gray) have done much in this direction. In Germany, the 'Versuchsanstalt' at Charlottenburg (under Professor Gary) does much with the assistance of Government funds. In Belgium, Commandant Welsch of the Ghent Fire Brigade, does much in a private way, and in London the whole matter was taken up energetically—and certainly more systematically than anywhere else in the world—by the British Fire Prevention Committee, who equipped and maintained a testing station for some five years under Mr. Edwin O. Sachs, Mr. Marsland and a small working executive.

"In Germany trustworthy information is now being obtained concerning nearly every article in the 'fireproofing' market, owing to a gentle pressure on the part of the municipal and other authorities, as well as that of the large building employers, who refuse to buy goods that have not been through a recognized test. In the United States such gentle pressure has recently been

brought to bear by some of the leading insurance corporations, who now take an intelligent interest in furthering better building construction and equipment. In this country little or no official or semi-official influence is, however, brought to bear on the manufacturer, and it thus rests entirely on the common-sense of the bona-fide trader to have his wares tested. He knows, of course, that there is already a very large contingent of professional men holding public offices, and also a considerable section of professional men in private practice, who look to the production of a report from the British Fire Prevention Committee before placing orders, and that the absence of such a report severely handicaps even the best articles.

"The great difficulty everywhere, however, has been to bring the unscrupulous or the ignorant tradesman into line, for neither in Germany nor the United States nor here is there any easily enforceable law which prevents the false description of an article or its fraudulent sale to the public. Even to-day in the three countries mentioned we find firms

who avoid reliable investigation—either knowingly having a bad article and wishing to palm it off on the public, or maybe in some cases ignorantly believing that they have a good article whilst it is a bad one. What is even worse, sometimes such stupid or unscrupulous people, as the case may be, organize amateur or bogus tests of their own, where with a considerable amount of flare





GENERAL VIEW OF BALTIMORE STREET BALTIMORE: INTERNATIONAL TRUST IN CENTRE.

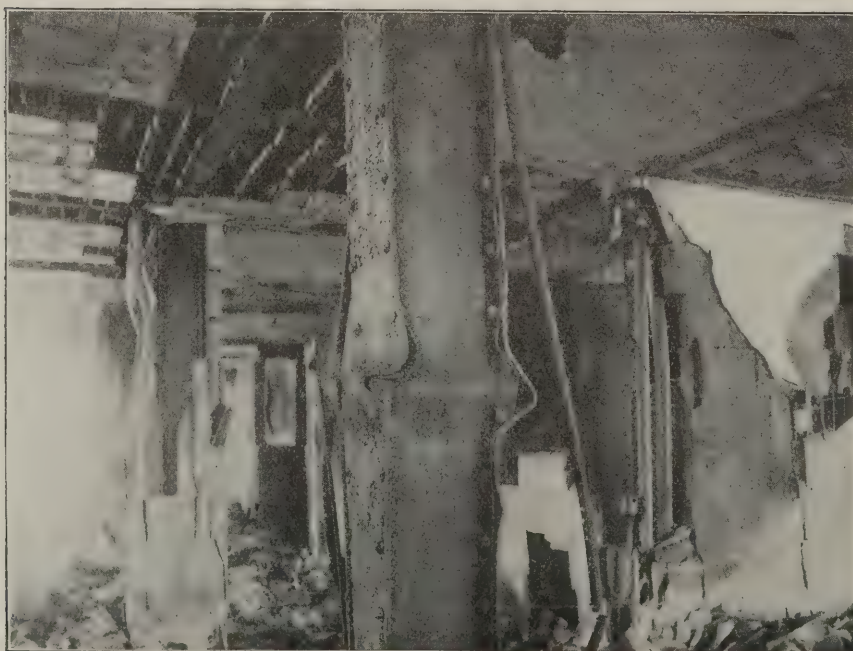
and smoke a false impression is given to the onlooker, who believes that the presence of smoke and flame *ipso facto* means a severe trial. Some of these amateur or bogus tests are even nowadays arranged on lines to simulate official tests, and pyrometers are employed, preferably mechanical ones, which jump spasmodically and indicate non-existent high temperatures, but which fully mystify the lay onlooker. A form of report is adopted so similar to the official reports as to almost deceive well-informed people; in fact, every possible device to make a good impression is tried. Some of these devices, we regret to say, even at times include a very excellent luncheon and the best of liquid refreshment.

"In Germany, last month, those primarily interested in putting a stop to the bogus tests in connection with the sale of the unreliable materials we complain of took the bull by the horns in a manner which has caused so much amusement in a wide circle, and has since then been so freely discussed abroad and caused so much merriment that we almost believe that the bogus test is fairly on the way to being killed by ridicule. The technical commission of the newly-formed Imperial Fire-Brigade Union of Germany invited a well-known expert in the

chemistry of fire protection to demonstrate the value of the smoke and flame fires which figure so largely in the bogus tests; in other words, the antidote tried was to show the small value and infinitesimal trial these mighty (*sic*) fires gave. All the usual humbug of great bundles of split wood, the barrel of petroleum, the barrel of tar beautifully covered with shavings, &c., was brought into play, not only in one instance but in half a dozen instances, different fires of different sizes and of different composition being exhibited. Before a large audience it was shown what little terror those wonderful fires had and what little heat was really generated by them, and for what infinitesimally short periods there was any high temperature, and, finally, with what little water they could be extinguished. In two instances large fires, of a superficial area of some 30 sq. ft., were extinguished with two or three litres of plain water applied from a small bucket or from a hand pump, and numerous other examples were given. The nett result is, that we scarcely believe that any firm trading in Germany will try the bogus test except, perhaps, before



THE EFFECT OF FIRE ON GRANITE COLUMNS AT THE BALTIMORE FIRE.



CALVERT BUILDING: EIGHTH FLOOR EAST WING.

a lay audience in out-of-the-way places. Nothing apparently will so thoroughly kill a thing as ridicule, and the wisdom of applying ridicule where other measures failed is certainly one that deserves not only congratulation but the greatest publicity possible. It is to be hoped that the well-known chemist who so ably conducted the demonstration on the Continent may be invited to this country and to the United States to repeat what he has shown. A few illustrations, if properly demonstrated before a large audience of professional men, if well reproduced in our illustrated papers, and preferably caricatured in our comic papers, will probably do more in a short time and at small expense than any amount of writing. But though it may be possible to put the brake upon, and even to a great extent stop, the bogus test by such methods as these, we still consider that even the cessation of such tests will not stop fraudulent sales, and that yet, say, the most unsuitable of tile floors will be sold as 'fire-proof,' and that some wonderful ferro-concrete construction in which the metal bars are within half an inch of the lower soffit will be palmed off on intelligent building owners under a similar description.

"Legislation of some sort thus becomes essential, and even if in the first instance only special classes of buildings are protected

against such fraudulent materials and equipment, say theatres, asylums, tall buildings and the like, there is no reason why the public generally should not be protected in the same way as they are guarded against purchasing margarine under some high-flown description as 'best fresh butter.'

"A recent conference on the Continent, supplemented by the experiments at Mayence, which caused so much interest amongst all conversant with the subject, must eventually lead to some remedy, and it is only to be hoped that the remedy in this country will not be quite as long in coming as is unfortunately so often the case, and that it may not require the occurrence of some great catastrophe to ensure the consummation so much to be desired.

"In the meantime, however, we would impress upon our readers the necessity of demanding credentials from the 'fireproofing' trade in the form of reliable independent reports. In this country the Fire Prevention Committee does the necessary work, and most of the leading proprietary floors and partitions have, we are pleased to say, been through the Committee's tests. In the United States the Boston Experimenting Station affords sound tests, and on the Continent the well-known 'Versuchsanstalt' at Charlottenburg. Of course at all these institutions it frequently happens that a proprietary article fails and the owner or maker sustains a serious blow. The good work of these institutions must thus cause considerable bad feeling among unsuccessful, ignorant or unscrupulous traders. But this, if anything, adds to the proof of their necessity, and only goes to show how much bad, dangerous and fraudulent work can be stopped by such organizations. The *bona-fide* trader, too, is unlikely to be so severely hit by a failure as his ignorant or fraudulently-inclined colleagues. We know of cases where the *bona-fide* trader after a failure has set about to improve his article: in other words, has taken his lesson to heart and has eventually been successful at a second test with some better piece of work. Thus good has been done both to the trader himself and the public by reliable investigation."



CALVERT BUILDING. BALTIMORE : SEVENTH FLOOR.

THE BALTIMORE FIRE.

IN this issue we reproduce four photographs of the Baltimore fire, one of them a bird's-eye view of the area devastated by this terrible catastrophe. An illustration on this page shows a damaged granite column on the third floor of the United States Public Stores, a structure of great solidity in which granite columns supported brickwork arches. These groined arches are 24in. thick at the crown; the granite columns were 24in. square, spaced 13ft. 2ins. centres. Fire came through a skylight with copper-covered roof, ignited the disused wooden drum of an unused hand-lift, which fell to the floor below. The stores were filled with valuable Japanese silks and

other perishable goods. The granite columns are to be replaced by brick. These stores were designed by the United States army engineers. There can be no clearer demonstration of the fallacy of trusting granite or stone where fire-resistance is concerned.

The photograph on the opposite page illustrates the destruction of the terra-cotta floors and terra-cotta column protection in the Calvert Building. It will be seen how a steel stanchion buckled under the heat after having lost its sheet covering, the nature of which is most clearly shown in the photograph; whilst it shows the destruction of the lower webs of the terra-cotta floors. Special attention is called to the fact that we do not believe these floors suffered from streams of water, as the mere touching by water would have wrought still greater havoc. The firemen with their hose never got near these floors.

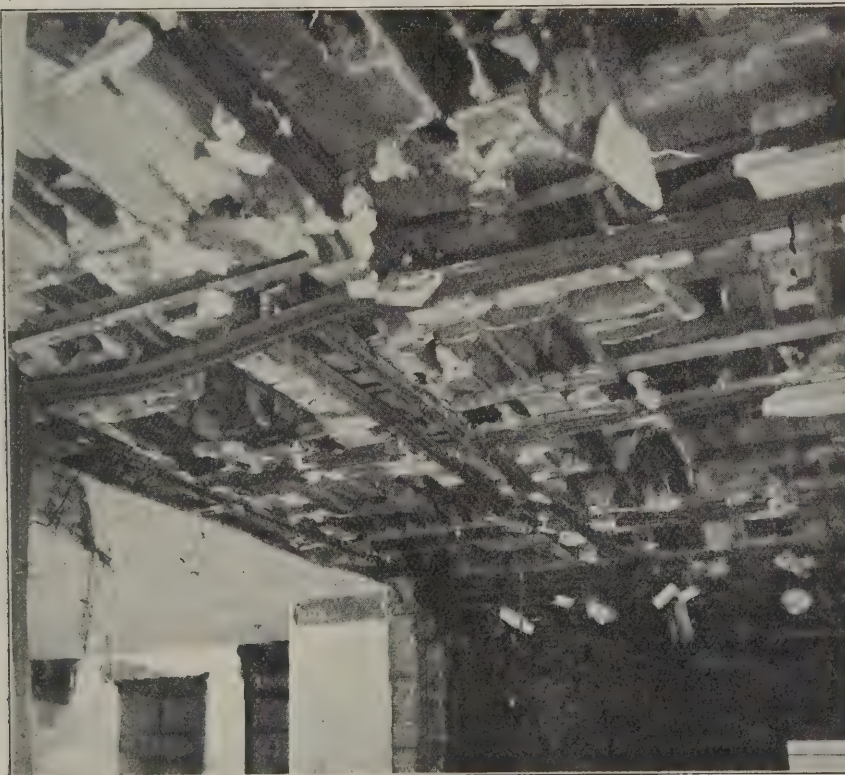
Below is a view of a corridor in the Continental Trust Building, where we again see the effect of the fire upon terra-cotta floors.

Having regard to the lack of understanding which unfortunately still exists as to the comparatively small fire-resistance afforded by such ordinary commercial thin-web terra-cotta floor lintels, we cannot do better than turn to the official Government report which was prepared by the Government expert. We have not the space to give the whole of it, but the points affecting the two buildings illustrated are reproduced in extract, as also some views expressed in the report as to the terra-cotta floor question generally.

In reading these remarks, it would be well to remember that in the United States terra-cotta floors are generally described as "tile floors."

Extracts from the Official Report.

"In the Calvert Building, the damage to the hollow terra-cotta floor arches was the loss of the lower webs, which was general throughout the building; in this building, however, the floor beams and girders remained straight and true. One column was badly buckled and will have to come out. All the column coverings will have to be removed. It has been stated that much of the damage to the column coverings here and elsewhere was due to the heating and buckling of iron pipes carried up in the space between the columns and their coverings; with this I cannot agree, for the pipes in many cases had their coating of paint per-



CONTINENTAL TRUST CO. BUILDING BALTIMORE : BASEMENT.

fectly fresh and undamaged, and they themselves were straight and true; yet the column covering was so badly damaged as to be beyond repair. I think that in all cases the column covering failed first. Where this occurred early enough in the fire, the pipes inside were heated and buckled, probably aggravating the failure of the covering; but, had the covering remained intact, the pipes would not have become hot enough to do any damage. . . .

"In the Continental Trust Building, the Maryland Trust and the Union Trust the damage to hollow terra-cotta floors was the loss of lower webs, as in all other cases. In the Continental Trust, column coverings of hollow terra-cotta are a loss throughout. . . .

"The trouble with the hollow terra-cotta tiles, as commercially applied, is that they have been skinned down to a minimum thickness: the webs are rarely more than $\frac{5}{16}$ in. thick. When exposed to the fire they soon get red-hot; the rest of the tile, being surrounded by dead air-spaces, remains cool; the change in temperature near the junction of exposed and non-exposed webs is so rapid that stresses are set up exceeding the strength of the material; and the exposed web drops off. If it does not do this under the heat alone, a stream of water from the nozzle of a fire hose quickly brings about the same result. If the material in the hollow tiles were made thicker, so that the entire variation in temperature would occur within the thickness of the exposed web, these stresses, tending to detach the web, would not exist; and a steel frame covered with such tiles would form a structure able to resist many fires with no loss to itself worthy of note. From such data as I have been able to gather I should say that if all hollow tiles were

made of porous terra-cotta, with webs not less than $\frac{1}{4}$ ins. thick, they would come through a fire not only protecting the steel-work but suffering practically no damage themselves; provided that they were made of a well-selected tough and refractory clay.

"As commercially applied, hollow terra-cotta column coverings are very flimsy; girder coverings are a little better, and the flat floor arches are the best of all, but these are none too good. The order of merit ought to be reversed—the column coverings ought to be the strongest feature, the girder covering next, while the floor arches might be the weakest, but all ought to be stronger than they are now.

"It is worthy of note that wherever the plaster was strong enough to adhere throughout the fire, the fireproofing was much less damaged than where the plaster fell off. . . .

The London Building Act is to go before Parliament in the coming session, and will probably be the subject of much discussion and acrimonious fighting, as the vested interests unfortunately cannot yet grasp the fact that fire prevention is an absolute essential for the modern development of a city, and that it is much to their interest that the development of London is such that it will not require a higher rate for fire-brigade purposes, or higher insurance premiums. The greatest curiosity is being evinced as to the extent to which the new Building Act will eventually be retrospective. It is obviously essential that it should be retrospective in many directions, but the opposition to the respective clauses will be very strong.

The L.C.C. Theatre Committee loses a useful official in the retirement of Mr. Mackay, who has long been associated with questions of theatre control.

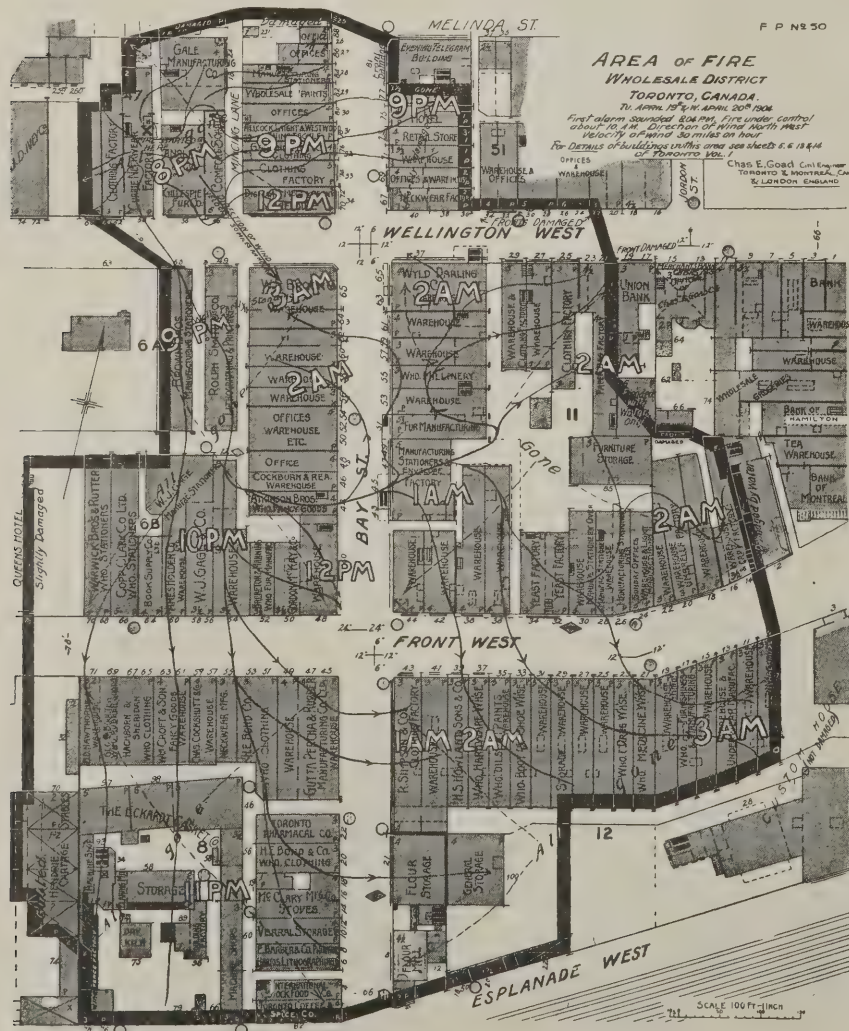
THE TORONTO CONFLAGRATION.

ACCORDING to "The Norwich Union Bulletin" of Toronto the following are the principal particulars of the Toronto fire of April last:—

Fire broke out at 7.30 p.m. on Tuesday, April 19th, 1904, and was not under control until 5 a.m. on the 20th. It originated in a building four storeys high, occupied by Currie & Co. for manufacture of neckwear. The elevator was not fitted with automatic traps at each floor, and when fire broke out it spread rapidly throughout the building. When the firemen arrived it was impossible to enter the Currie premises. The building was separated by a lane 12ft. wide from a six-storey building occupied by Ansley & Co., wholesale hats and caps, and by the Gillespie Fur Company, wholesale furriers. The chief of the fire brigade endeavoured to prevent the flames crossing this lane by taking the hose through the Ansley building and fighting the fire from the roof, but the spread of the flames across the lane was so rapid that the retreat of the firemen was cut off, and they had to use the hose as a fire-escape by which to descend to the street level. Fanned by a high wind (about 30 miles an hour) the flames spread from building to building until within an hour at least a dozen separate structures were ablaze and help was being summoned from neighbouring municipalities. The fire soon crossed Wellington Street, 66ft. wide, and swept in a very short time from end to end of the warehouse and bookbinder of Brown Brothers & Co. and the lithographing establishment of Ralph Smith & Co., then going south across Piper Street and courtyards about 40ft. in width to the warehouses on the north side of Front Street. After securing a firm hold upon these warehouses, it crossed Front Street, 66ft. wide, and rapidly destroyed every building between Front Street and the Esplanade. The flames then started to travel to the east, crossing Bay Street below Front, and to the Barber & Ellis envelope factory and stationary warehouse two doors above Front Street.

From the Barber & Ellis warehouse the fire spread north and south and east until nearly all the buildings in the block from Wellington and Front, and east to Bay, towards Yonge, were burning, at the same time working up the west side of Bay Street in the direction from which the fire had started. When the fire reached the warehouses on Wellington Street east of Bay, as it was going against the wind the firemen were able to make a stand and prevent the conflagration crossing, but not without considerable damage to the buildings on the north side of that street.

The fire was finally controlled at the envelope factory of Kilgour Brothers, which was equipped with automatic sprinklers on each floor and also had open sprinkler heads at the windows. The sprinklers protecting the windows were supplied only from the city mains, and when the great draught upon these reduced the pressure, no water was supplied to the heads at the upper windows, with the result that the roof of that portion of the premises fronting Wellington Street and extending 200ft. to the south was completely burned off, with serious damage at every window, but the sprinklers within these premises prevented the conflagration securing a firm hold upon it and the only portion completely destroyed was that fronting on Wellington Street and extending back about 50ft. Adjoining the rear portion was an addition five storeys high, 50ft. by 75ft., which was also protected with water curtains upon the windows overlooking a warehouse used by the Simpson Co. for storage of furniture. Although this furniture warehouse was completely destroyed and the heat



AREA OF THE TORONTO FIRE.

from its burning must have been intense, only a few panes of glass were broken in the Kilgour warehouse. This building also diverted the flames so that they beat on the side instead of the rear of the Minerva Manufacturing Co. on Front Street opposite the Custom House. This fact enabled a stand to be made to protect the rear windows of the Minerva Building, while the west wall of the structure rising two storeys above the adjoining buildings on Front Street also afforded a good vantage ground. They did secure a hold on the roof but only for a short time. At these two points the conflagration may be said to have been held.

Toronto has been fortunate in the matter of fires in the past. With the exception of the three large fires of 1895, the record has been good. The fire-fighting equipment has been improved from time to time, and while not having as many engines as should have been provided, the appliances were in good order and the brigade efficient. The accident to the Chief and his enforced removal to the hospital at the commencement of the fire had probably an adverse effect upon the brigade.

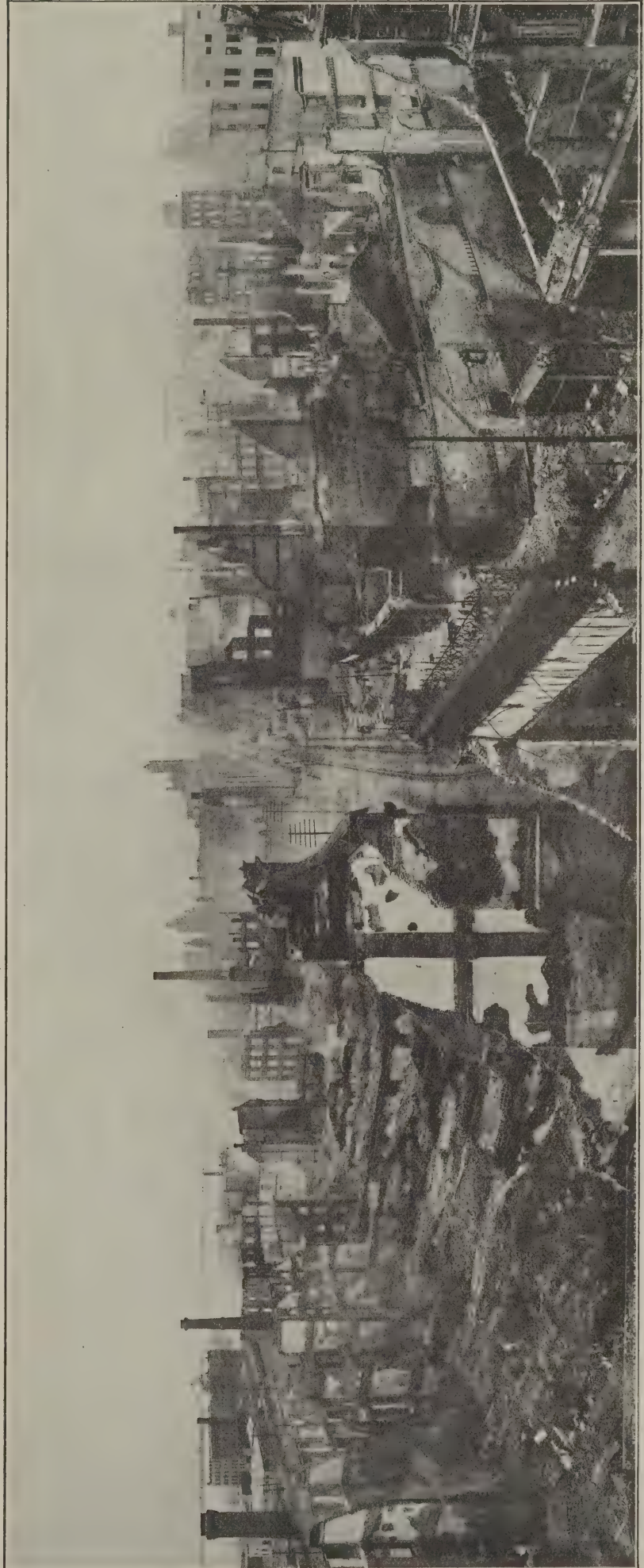
The lesson to be learned is the great danger from elevators and open stairways or well-holes which allow communication of smoke and fire from floor to floor throughout the building. It is quite possible to so construct a warehouse that there is no communication from floor to floor. The large departmental store of Macey & Co., of New York, has been constructed with staircases and elevators cut off from the rest of each floor by partitions of wire lath, covered with plaster on both sides, and, where glass is required for lighting, wired glass is used. This wired glass is made by inserting into the glass a wire netting of about $1\frac{1}{4}$ -in. mesh when the glass is hot, and it is rolled out flat with the wire in the centre, the glass being about $\frac{1}{4}$ in. thick. Tests have shown that it will stand the fiercest fire without breaking, and if the glass is set in a metallic frame it is more effective in preventing fire entering a building than a metal shutter or a wooden one covered with metal.

Openings from floor to floor in a warehouse not only facilitate the spread of the flames, but also the smoke, so that when the firemen arrive upon the scene they waste precious moments in endeavouring to find where the fire is actually burning.

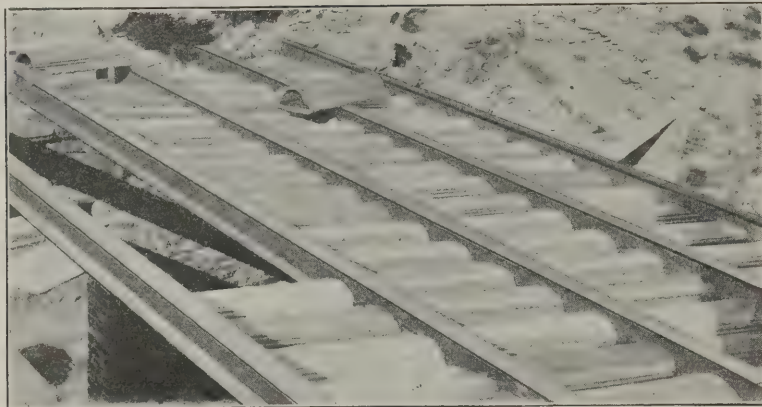
The next lesson is that all openings towards adjacent buildings should be carefully protected. There is no doubt that the immunity from fires in Great Britain and on the Continent as compared with the United States and Canada is due to the fact that great attention is paid to the erection and maintenance of proper fire walls dividing adjacent premises. The greatest carelessness, and even recklessness, is often shown in regard to this very matter, fire walls being cut to oblige a tenant, when such should under no consideration be allowed.

The list of losses sustained by companies will doubtless be interesting. It may be pointed out that the losses by this fire will amount to, roughly, 75 per cent. of the entire income for the year. Fires had been quite numerous since January 1st prior to this conflagration, so that at least 20 per cent. of the year's income of the companies had already gone for losses. As the expenses average a little over 30 per cent., about 125 dols. has already been spoken for out of over 100 dols. of income which the companies will receive during 1904. It certainly makes a poor outlook for underwriting this year. Every additional loss means so much more to the bad. In view of this, and the fact that the average earnings of the companies has been less than 1 per cent. of the income, there can be no doubt about the absolute necessity for the companies to increase the rates if they are to be maintained in a solvent condition.

Ninety-eight separate buildings were



THE TORONTO FIRE: GENERAL VIEW.



CONSTRUCTION OF TERRA-COTTA FLOOR SUBJECTED TO THE NEW YORK OFFICIAL TEST.

burned, every one built of brick, with first-class roof.

Area burned over was 1,200 ft. from north to south and 900 ft. from east to west: about 20 acres. Total amount of loss, less reinsurance and salvage, 4,172,000 dols. (£834,500).

TERRA-COTTA FLOORS.

A New York Official Test.

AT a time when so much is being said and written about the relatively low value of terra-cotta floors for fire-resisting construction, we reproduce an extremely interesting photograph illustrating the result of a fire and water test undertaken as far back as 1896 by the Department of the Superintendent of Buildings in New York. This report was published by our contemporaries in the United States, but we cannot trace any reproduction of it in this country.

The floor was what we would term a terra-cotta floor and the Americans a "tile" floor. It covered the testing chamber, which measured 12 ft. by 15 ft. by 10 ft. high inside. The girders were 6 in. 11'9 lbs. Pencoyd beams placed at 2 ft. centres. The terra-cotta placed between the beams was in the form of hollow semi-cylindrical lintels resting on the lower flanges of the girders at an angle of about 67½ degs. to the beams, with their cylindrical surface upwards. These supported the filling of concrete, which covered the beams by about 2 ins. The underside of the floor was covered in the ordinary manner with a coat of plaster and one coat of "hard-finish" plaster. The uniformly distributed load of 150 lbs. per sq. ft. was placed on the

two centre bays of the floor area. The fire applied was one of hickory cord wood well seasoned, saturated with oil previous to lighting. The duration of the test (including the application of water) was three hours, water being applied at the end of 2¼ hours through a 1½ in. nozzle. The temperature rose up to 2,200 degs. Fahr.

The effect of the fire and water test is described as follows:—

"During the process of the fire large cracks developed in the upper part of the floor, near east and west walls, and near east and west lines of load. Most of the plastering fell off during the fire, and when the water struck the hot tiles they cracked and large pieces fell off.

"A majority of the tile lintels were cracked and from many of these the lower part had broken off and the concrete under them was washed away in places."

Whatever may be the fire-resisting qualities of this type of terra-cotta floor, it of course has the advantage of shallowness and rapidity in erection without centering. The test is eight years old. With the lessons taught elsewhere and the experience thus obtained, manufacturers of such floors will no doubt soon be improving the character of the material used, and will pay due regard to questions of expansion and contraction.

Views and Reviews.

A Partition Test.

No. 88 of the British Fire Prevention Committee's publications is a report on a partition test. The partition (of which Messrs. Cullum

& Co., of London, were the makers) was built up of "Kulm" slabs, formed of a porous mixture of pumice stone, volcanic sand and Portland cement, the slabs weighing 14 lbs. per sq. ft. The partition was plastered on the fire side only, and the total width, including plastering, was 3½ ins. The test placed this partition in the "partially protective" class under the Committee's universal standards of fire resistance, which require the partition to withstand a test of fire for two hours at high temperature, followed by the application of water. The "object" and "summary" of this very interesting test is subjoined. We believe the partition to be the first of the thickness named that has withstood this test of two hours' duration; the majority of thin partitions so far tested have not been under fire for longer than an hour and a half.

Object of Test.—To record the effect of a fire of two hours' duration at a temperature gradually increasing to 1,800 degs. Fahr. (982°2 degs. C.) and not to exceed 2,000 degs. Fahr. (1,093°3 degs. C.), followed by the application of water for two minutes on the fire side with the view of being classified as affording "Partial Protection" (Class B).

NOTE.—The area of the partition under investigation was to be at least 75 ft. super. (6'97 sq. m.), with a width of 10 ft. (3'048 m.). The thickness of the partition was 3½ ins. (0'79 m.).

NOTE.—The time allowed for the construction and drying of the partition was fourteen days.

Summary of Test.—No effect of the fire was visible on the passage side, and there was no buckling of the partition, nor were any cracks visible.

The fire and smoke did not pass through the partition or joints.

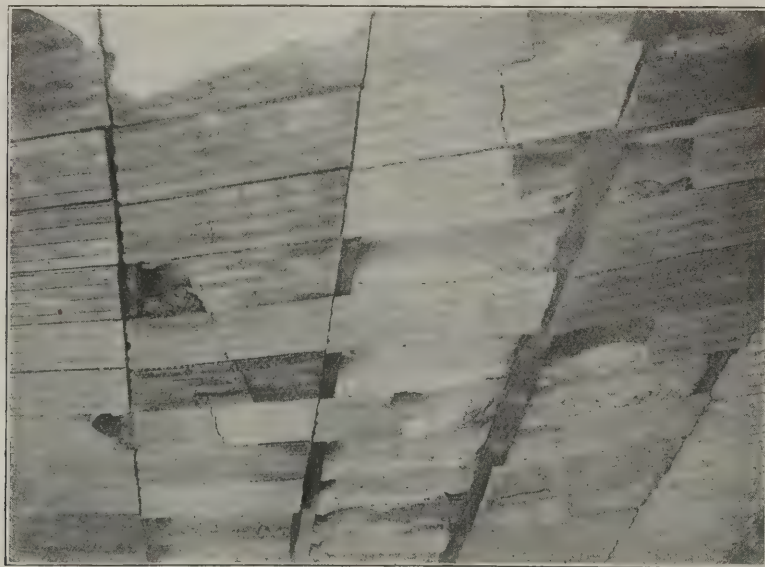
The recorded temperature in the passage on the outside of the partition at no time exceeded 210 degs. Fahr. (98°80 degs. C.).

The effect caused by the application of water was to knock off portions of the plastering on the fire side, and to cause dampness to show on the passage side.

The Fire Exhibition at Earl's Court.

This volume differs materially from the usual exhibition report inasmuch as the information it contains is of a very general and historical character, and the illustrations are of unusual excellence. All who are interested in the history of the service and the position of fire protection at the beginning of the current century should have the volume on their shelf. There is no doubt that it will long be a standard reference book, more particularly in respect to the numerous historical relics, pictures and engravings of fires, &c. The book is well-printed, carefully bound and practically arranged. It suffers, if anything, from a too elaborate presentation of historical data. We give an illustration from it. This shows an eminently practical self-aid and fire-alarm call box as used in Birmingham and fitted up in accordance with the designs of Superintendent Tozer, of the local brigade.

Due attention has been given in the volume to the various institutions which assisted in organizing the International Fire Exhibition, notably the National Fire-Brigades Union. It should be of general interest that this excellent society counts more than 600 brigades among its members and is doing splendid work throughout the United Kingdom and the Colonies. The only feature of the Union's organization which we think has been somewhat neglected, and which certainly requires the assistance of the general public, is that of its widows' and orphans' fund. That fund is much too small at present for so formidable a body, and we consider that if its merits were duly placed before the public, more particularly before the large landowners and provincial magnates, it would not be long



A NEW YORK TERRA-COTTA FLOOR AFTER BEING SUBJECTED TO TEST BY THE MUNICIPALITY.

before this fund were put on a firmer basis. We specially refer to the National Fire-Brigades Union in connection with this book because it cannot be sufficiently well known how splendidly that body assisted the British Fire Prevention Committee in organizing the exhibition, which has done an enormous amount of good for the country and has given an impetus to the whole question of fire protection throughout the world.

"A Record of the International Fire Exhibition, Earl's Court, London, 1903." Illustrations on 100 plates. Price 15s. nett. Royal octavo, 370 pages, bound in red linen.

The Baltimore Conflagration.

The British Fire Prevention Committee in Journal No 1—a publication of quarto size—have just issued some valuable particulars regarding the Baltimore fire. Three reports are presented—a summary, an excellent map of the burnt district and some seventy very valuable illustrations.

The publication is one of the best issued by the society in question, and it is only to be regretted that the true constructional lessons of the conflagration do not receive the attention they should have from the public authorities.

TEMPERATURES AT GREAT FIRES.

WHEN the London Fire Congress of 1903 fixed upon certain temperatures as those that should be reached during experiments or official tests of fire resistance there was considerable diversity of opinion as to the actual temperatures obtained in great fires. In fixing the temperatures the proposers of the figures were guided by the experience of the great fires. The manner of ascertaining the temperatures had been by hunting for metallic parts fused or melted in that fire, from which deductions could easily be made. The minimum final temperatures adopted for the tests ranged from 1,500 degs. Fahr. to 1,800 degs. Fahr., in accordance with the severity of the test desired, and it was decided that for practical purposes temperatures above 2,000 degs. Fahr. need scarcely be considered.

In the United States a similar discussion as to the correct temperatures for testing purposes has arisen, many people being of the opinion that the testing temperature of

1,700 degs. Fahr., used in New York, is too low. Hence it is of considerable interest to present the views of Professor Woolson, of Columbia University, who is thoroughly conversant with the question, and a great authority on fire tests. His views as to the temperatures at the Baltimore conflagration are extracted from a report which has appeared in our insurance contemporary, the New York "Insurance Engineering." Professor Woolson says:—

"In studying the effect of heat and flame on building materials in a general conflagration one of the first questions to be asked is, 'What was the temperature of the fire?'

"The temperatures developed in the Baltimore fire have been estimated by numerous writers as from 2,500 degs. to 4,000 degs. Fahr., and the statement has been repeatedly made that different kinds of metals were fused, including cast-iron and steel. Now, I will not dispute that such things have occurred in rare instances, but as a general proposition the statements are not founded on fact. In going through the ruins, myself I looked carefully for evidences of melted metal, and I have asked a number of other gentlemen who have studied the ruins carefully, and thus far I have been unable to find a single instance of the actual fusing of metals other than solder and lead.

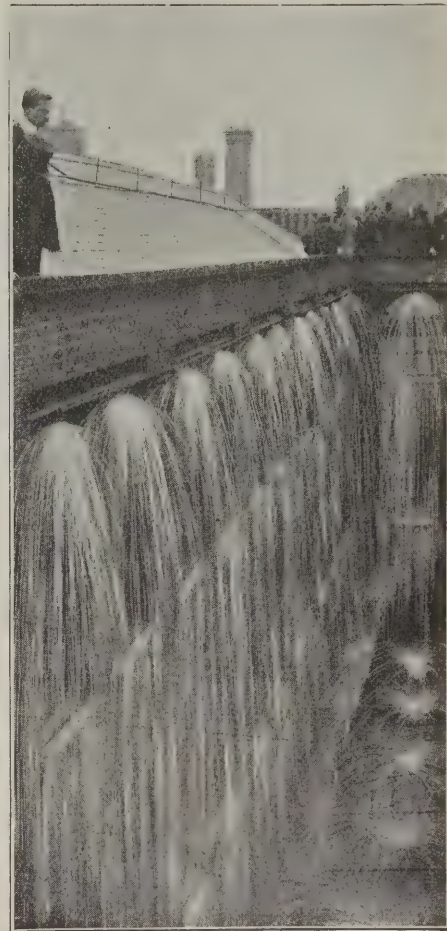
"Glass melted freely, and hung down from the light fixtures in fantastic forms, but the brass fixtures were everywhere intact so far as I have been able to learn, and the same was true (except for the soldered parts) of thermometers, clocks, telegraph call-boxes, typewriting machines, as well as brass, bronze and iron railings, which were plentiful in all the buildings. Iron was sometimes distorted, but if under stress it will do that at a red heat, or about 800 degs. Fahr. From all this evidence I am convinced that the average heat of those buildings was not far from 1,500 degs. to 1,800 degs. Glass softens and flows at 1,000 degs. and melts at 1,200 degs. to 1,800 degs. Fahr. Brass will go from 1,800 degs. to 1,900 degs., whilst cast-iron requires 2,000 degs. or over, and wrought-iron 2,700 degs. to 2,900 degs.

"The reason for such complete combustion of all inflammable material was because of such long continued heat, and the fact that after a building had burned out the air that blew through it was heated to a furnace temperature by crossing acres of fire. So it completed the destruction of any particles of wood or other material which had previously survived.

"This question of temperature is a valuable one to those of us who conduct practical fire tests upon building materials. The Building Code of this city (New York) has adopted 1,700 degs. Fahr. as the temperature at which its tests are to be made, assuming it to be the average temperature of a burning building. It has been somewhat criticized in the past, but I think the results at Baltimore prove that 1,700 degs. is as nearly correct as it can be made."

Supplementary to the above we give the following views of Mr. Howard Constable, the well-known American authority:—

"As regards the severity of the fire in general (as a measure of the foe we have to resist), I believe it was equal to Chicago, more severe than Boston. I examined many buildings and much of the debris in all parts of the burnt district, besides inspecting some 1,700 windows and other features, and did not find enough melted iron, brick, stone, terra-cotta and concrete to justify the claims of intense temperatures. I found the 'melted granite columns' (so much written about) merely spalled and cracked by heat and water. The 'melted solid cast-iron columns and steel beams' were merely buckled or distorted by heat, or cracked and distorted by heat and water or falling material."

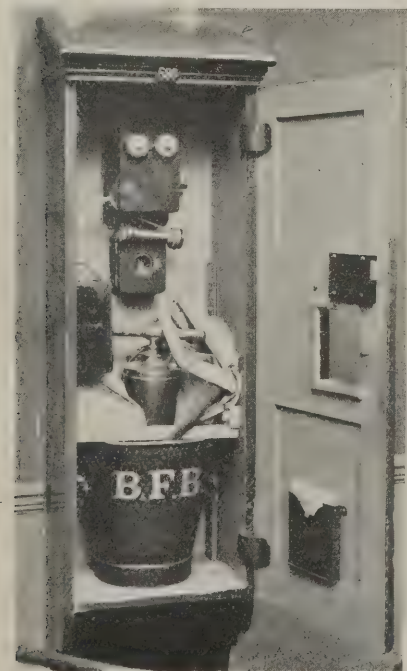


"DRENCHER" PROTECTION TO THE EXTERIOR OF A WAREHOUSE.

CITY WAREHOUSE "DRENCHERS."

THE photograph reproduced on this page show the Jaeger Co.'s warehouse, 95, Milton Street, London, E.C., on the occasion of a recent display. The system of outside drenchers which the Jaeger Co. have installed on every side of the large buildings which form their headquarters is a very remarkable advance in protection against conflagrations. Closely surrounded by other buildings, the Company have seen the importance of protecting themselves from fires which may occur in their vicinity. An additional and novel feature in connection with the drenchers is the installation of a hydraulic injector, which, working at a pressure of 80 lbs. to the sq. in., is fully capable of raising the water from the mains to the top of the buildings. These protections, in addition to inside automatic sprinklers, have been recognized by so substantial a reduction in the heavy insurance premium which the Company have to pay that the outlay involved, large as it is, will be recouped in the course of a comparatively few years.

The display of the drenchers was instructive. One after the other, by turning on independent valves, the various faces of the buildings were completely covered with a sheet of water, probably sufficient to prevent any fire from outside getting a hold. The roof is also protected by drenchers. The valves which serve the several sides and roof of the building are operated from the pavement. The police on duty in the district are said to be acquainted with the working of them. Such systems of protection against external hazard is to be strongly commended in the interest of insured and insurers alike, but it is essential that the appliances be kept in perfect order and the drencher points cleaned weekly. Otherwise these outside points very easily get blocked by dirt.



COMBINED "SELF-HELP" AND FIRE-ALARM STREET BOX, BIRMINGHAM.



THE ANTWERP PETROLEUM FIRE.

THE ANTWERP PETROLEUM BLAZE.

SO far as area is concerned, the Antwerp petroleum blaze holds a unique position, for no less than 10 acres of ground were at one time covered with burning petroleum, and the amount of damage done in stored petroleum and petroleum plant was enormous. The fire teaches numerous lessons, first among which is the necessity of entirely isolating the storage ground allotted to the petroleum business, and, secondly, the necessity of dividing up the risks in petroleum storage. Besides this, it is essential that some means should be conceived beyond the ordinary ventilation of petroleum tanks in order to minimize the risk of explosion.

From the plan on this page the general scene of the fire will be understood. There were three petroleum companies located on the area, namely, the American Company, Messrs. Rieth & Co. and Messrs. Eiffe & Co. The American Company's store and the Eiffe Store were those affected by the fire. These stores were separated by ground in the occupancy of a Dutch company, who were erecting tanks but had not yet commenced business on the site. The American Company had five large tanks and four small ones surrounded by brick walls, standing on concrete foundations, whilst Messrs. Eiffe & Co. had a number of tanks of large capacity surrounded by a concrete wall.

It appears that the explosion took place in the forenoon of August 26th. The cause is not known, but that an explosion took place in the tank marked X is quite obvious, and any doubt which may have been put forward by the experts of the petroleum trade, both on the Continent and in this country, can only have been expressed without due cognizance of the facts and without due recognition of the usual signs of explosions.

Whether the explosion took place at the initial stage of the fire (which may have been due to a leak of oil or vapour) or whether it occurred later, are questions very unlikely to be solved, but that an explosion occurred in the earlier stages is quite apparent to all who have examined the ruins.

The force of the explosion blew down the brick walls surrounding the American Company's tanks, the oil poured forth in large quantities, and spread over the surrounding ground, which soon became an enormous lake of fire. It spread to the Eiffe stores.

We doubt if walls are so suitable as embankments for the surrounding of oil stores, but if walls must be used they should be of

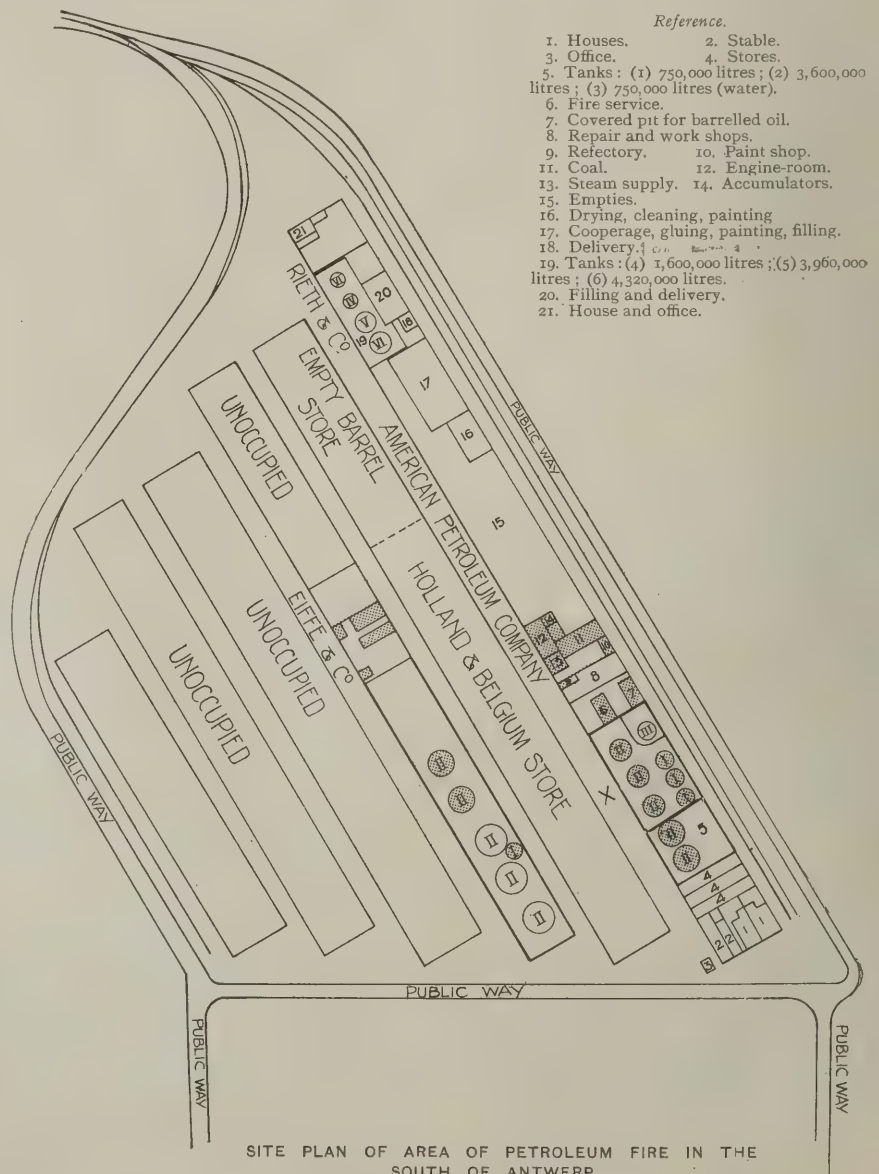
considerable strength and preferably of the ferro-concrete type. The walls blown down were only about 2ft. thick at the base, tapering to gins. at the top. There was no division either by embankments or walls between the different tanks, though we certainly consider this to be a necessary precaution.

We think all cooperages, workshops, &c in connection with oil stores should be substantially built, and the level of the ground floor of such buildings at least 2ft. above the level of the ground on which the petroleum tanks stand, so that any petroleum flowing out does not necessarily immediately flow into the adjoining buildings.

Should architects be entrusted with work appertaining to petroleum stores, they should certainly bring their influence to bear upon the question of isolation, division by embankments, and the sub-division of risks. The Antwerp fire is an object-lesson in unsatisfactory isolation and division of risks.

The scene of the fire has been visited by the leading experts of Europe. Among the visitors from Great Britain were Captain Thompson (H.M. Chief Inspector of Explosives); Dr. Boverton Redwood (adviser on petroleum to the Home Office); Mr. Edwin O. Sachs (chairman of the British Fire Prevention Committee); Mr. James Sheppard (surveyor to the North British and Mercantile Insurance Co.); Lieut.-Colonel Fox (Chief Officer of the London Salvage Corps); and Mr. Stubbins (Chief Officer of the Great Eastern Railway Co.'s Fire Brigades).

The Lord Chamberlain's Theatre Regulations come into force at the end of November. They are on much the same lines as those of the London County Council, and have been issued in consultation with the legal adviser of the Theatre Managers' Association.





THE ANTWERP PETROLEUM FIRE.

THE CELLULOID FIRE IN PARIS.

IT is well known that one of the most difficult problems to be solved by the public authorities is the question of fire-protective legislation for buildings in different occupancies, with different tenants plying different trades—generally on a small scale—and with tenements perhaps on the upper floor. Another great difficulty is the question of regulating the storage of highly inflammable materials and explosives in such buildings, or as a matter of fact in buildings generally, where situated within the precincts of a town.

There can be no more forcible example of the risks in a building in different occupancies, and the risks accruing from the dangerous storage of highly inflammable material, than that of the fire which occurred in the Boulevard Sebastopol, Paris, on Saturday, February 20th last. Here, regardless of any question of the high efficiency of the Paris brigade, its splendid long ladders and other apparatus, the mere fact of the existence of the highly inflammable material and the existence of so many occupancies resulted in a most serious loss of life, though the damage done to property was nominal—in fact, the building satisfactorily withstood both the original explosion which caused the disaster and the fire.

We give a rough sketch plan of the scene of this fire, which occurred in a corner building.

The subjoined summary tells its one tale, and the lessons are too obvious to require much explanation. Only one point we think we should refer to. It is that the staircase running through the building was 4ft. wide from basement to fifth storey, and then 2ft. 4ins. from the fifth to the sixth storey.

The direct cause of the explosion has not, we believe, been ascertained, but it is generally assumed that it was due to the fact that a quantity of celluloid was being treated—distilled—when the explosion took place, and further that the weight of celluloid was apparently over 1,500 lbs. The work of the brigade was materially hampered by celluloid fumes and the black smoke associated with such fires.

The Actual Fire.

The following is a summary of the facts:—

On Saturday, February 20th, 1904, about 1.15 p.m., a serious explosion occurred on the fourth floor of No. 65, Boulevard Sebastopol, Paris, the building being located at the corner of this boulevard and of the Rue Etienne Marcel.

A mass of debris came down below with a crash and the windows of the houses on the other side of the boulevard were blown out.

The floor was occupied by a small tradesman and wife, who had kept a store of celluloid and horn articles.

The fifth storey was occupied by a trimming workshop, and the sixth was divided into four apartments.

Three fire-brigade stations of the Paris Fire Brigade turned out in answer to calls by fire alarms at 1.18 and 1.19 p.m., and arrived on the spot between four and seven minutes after the call.

When the first escape arrived, the whole of the fourth floor was ablaze and the flames shot out of the windows upwards over the roof, showing that the fire was extremely violent.

The explosion having blown out all the windows and doors, the draught facilitated the fire spreading with great rapidity to the higher storeys and cutting off the retreat of the inhabitants on these higher levels.

The almost simultaneous arrival of the different fire appliances and escapes allowed of rapid action. Three escapes were raised: first the one to the balcony at the end adjoining No. 3, Rue Etienne Marcel, a second to the southern end of the balcony, facing Boulevard Sebastopol, and the third at the corner of Boulevard Sebastopol and Rue Etienne Marcel.

On the sixth floor, a man and his wife, after having closed the door of their apartment (thrown open by the explosion), had

the presence of mind to keep their windows closed, bathing their faces to keep fresh and at intervals opening the window to attract attention by means of a napkin. They were saved by two parties of firemen—one party creeping on the roof and sliding down in the gutter roft. below, the other party by using an escape from which they extended a pompier ladder to the sixth storey. The rescuers had to pass through flames twice.

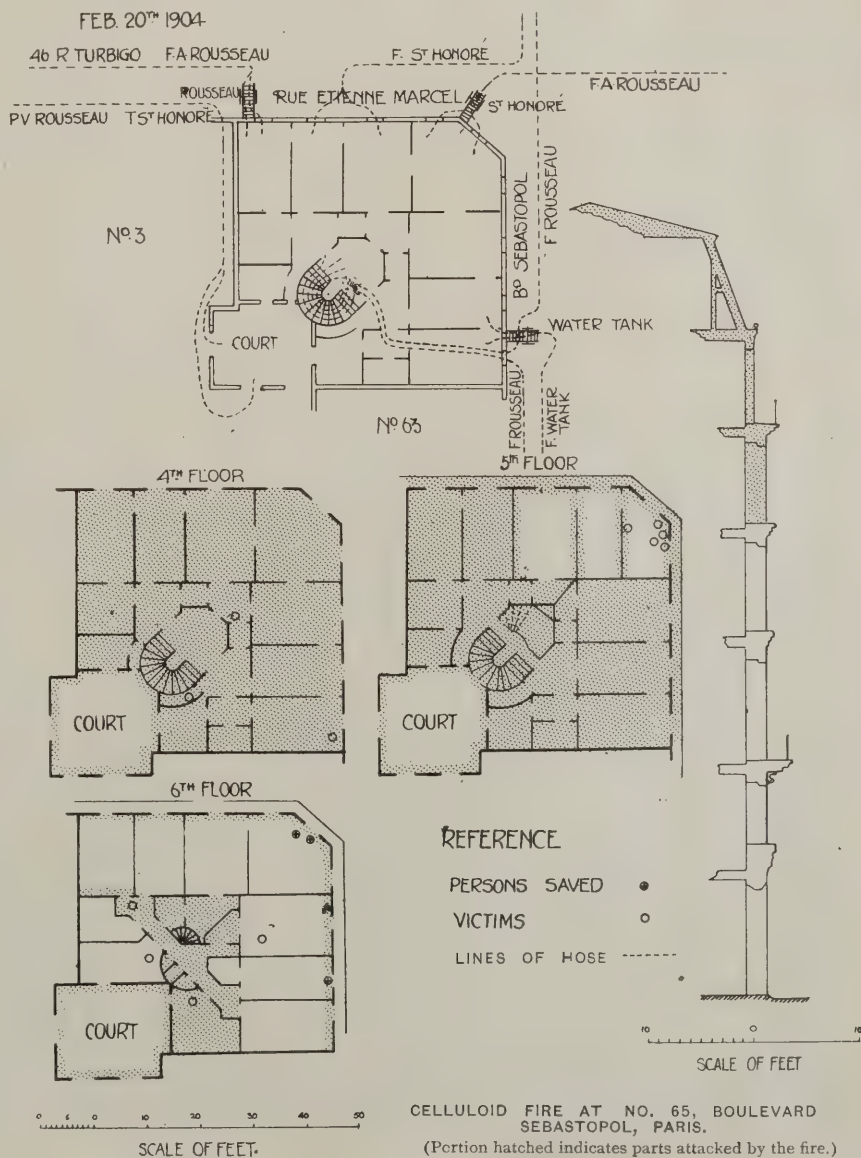
A woman leant against the roof in front of a window facing Boulevard Sebastopol, with her legs in the gutter. She also was saved by the firemen, who managed to tie her up with a rope and haul her to the roof of the neighbouring house.

The fire was practically over at 3.20 p.m. Then twelve persons were found dead in the rooms of the different floors--i.e., three on the fourth floor, five on the fifth floor and four on the sixth.

Besides this, five persons (one man and four women) had jumped from a window on the fourth storey before the arrival of the firemen, and three of them have died from the injuries they sustained.

The total list of deaths was thus fifteen.

The London Fire Brigade has been strengthened by the addition of a fourth officer, long necessary owing to the increasing amount of surveying work in connection with factories, theatres, &c. Mr. Dyer, A.M.Inst.C.E., son of the well-known vice-president of the National Fire Brigades Union, has been chosen for the post.



THE BUDAPEST FIRE CONGRESS.

THE visit of the British delegates to the Budapest Fire Congress and to other cities in Central Europe will be made the subject of an official report by the British Fire Prevention Committee, so that a detailed description of the journey would be premature. Nevertheless the following particulars indicate the general arrangements made in connection with the visit.

The Budapest Fire Congress was organized by the International Fire Service Council, and was held in the Hungarian capital at the invitation of the Hungarian Fire Brigades Union. It had the benefit of the patronage of the Hungarian Government, of the Budapest municipality, and of many notabilities, and the first and second backed up their patronage with money grants to meet expenses.

The business meetings took place on August 18th, 19th and 20th, and occupied three hours a day, dealing with a number of valuable papers, which were thoroughly discussed, as well as a suitable amount of general business. The chief British paper read was that on fire-alarms, by Mr. James Sheppard, surveyor to the North British and Mercantile Insurance Company.

The party visiting Budapest numbered ten, nine of whom represented jointly the British Fire Prevention Committee and the National Fire Brigades Union, the arrangements being in the hands of the hon. secretaries of these two bodies, Messrs. Marsland and Folker, and of Mr. Edwin O. Sachs, who acted as chairman of the Commission. Besides the above-named, the party comprised, in alphabetical order:—

Mr. Max Clarke, F.R.I.B.A. (of the British Fire Prevention Committee),

Mr. Percy Collins (of the British Fire Prevention Committee),

Chief Officer Hallows (of the National Fire Brigades Union),

Chief Officer Pizey (of the National Fire Brigades Union),

Chief Officer Pritchett, F.R.I.B.A., F.S.I. (of the National Fire Brigades Union),

Mr. James Sheppard, A.I.E.E. (of the British Fire Prevention Committee), and Lieut. - Col. Fox, F.R.G.S., London Salvage Corps (of the National Fire Brigades Union), accompanied the Commission to Budapest.

Members of the party each took notes in respect to special departments in which they were particularly interested, with the view of compiling the general report.

Each member in turn took on duty as "Officer of the Day," so as to make things as comfortable as possible whilst travelling. The actual time occupied in travelling was four days and four nights. Three days were given to recreation (respectively in the Balaton Lake in Hungary, at Salzburg in Austria, and on the Rhine in Germany), and ten days were occupied in attending the Congress meetings at Budapest, and inspecting the various other cities visited. These cities were:—Presburg, Vienna, Salzburg, Munich, Nuremberg, Frankfurt and Cologne. At each the greatest facilities were given to the deputation, and everywhere just those things were shown them which they wished to see, namely, the fire-brigade equipment, new fire-brigade stations, new theatres, new warehouses, and the arrangements for enforcing the local building Acts and undertaking local fire surveys. Everywhere the doors were thrown open to the commissioners, preliminary arrangements having been made wherever required through the official channels. It is needless to say that considerable hospitality was also enjoyed throughout the journey.

The arrangements for the Budapest Congress were in the hands of Count Victor

Szechenyi, chairman of the Hungarian Fire Brigades Union, and Secretary de Breuer, of that body, both able organizers possessing great tact and ability.

Probably one of the most interesting demonstrations seen at Budapest was the starting of the whole sprinkler system over the stage of the Royal Opera House, which was flooded by way of a show for the visitors. Another interesting display was that of the private mill fire brigades at one of the large flour mills at Budapest.

Throughout the journey the visitors were unanimous as to the enormous amount to be to be learnt among the various Central European cities, which are by no means sufficiently visited by the professional men of this country. They were much impressed by the excellently planned new fire stations at Munich, Nuremberg, Frankfurt and Cologne, and by the theatres. It is not, however, our intention to go into technical details of the journey on this occasion, but to await the official report, which should prove instructive.

Obviously, journeys of this kind, if carefully planned and well-carried through, must be of considerable benefit to the building and fire service world at home, especially if the results of such visits are duly disseminated in published reports.

NOTES.

The Fire Brigades Bill of Mr. Guy Pym, M.P., is again about to be energetically pushed forward, and it is to be hoped that the ballot will give it a good place for the next session.

The National Fire Brigades Union will have its next annual camp and competitions at the Crystal Palace, where the grounds are eminently suitable for the work undertaken by this body.

The First-Aid Congress held in Paris this month in connection with the hygienic and life-saving exhibition at the Grand Palais had a section devoted to fire prevention and questions of self-help in case of fire. There were, however, no papers at this conference calling for special comment, the whole movement of fire prevention and self-help in case of fire being in its infancy in France.

New Theatre Regulations at Liverpool have been issued. They are an improvement on those previously in force. Liverpool enjoys the advantage of a local magistrate having a special surveyor appointed to look after the question of theatre protection, and the surveyor works in combination with the chief superintendent of the Liverpool Police Fire Brigade. Both are eminently practical and up-to-date officials.

A German Special Commissioner has been looking into the question of theatre safety in London, inasmuch as the head of the Theatre Department of the Berlin Royal Police has been specially commissioned to study our theatre regulations and examine our methods of protection. The commissioner had facilities accorded him, and was much impressed with the manner in which the work was conducted by the Superintending Architect (Mr. W. E. Riley, F.R.I.B.A.) and his theatre branch at the London County Council.

The International Fire Library which is being organized by the British Fire Prevention Committee will apparently be open to others than members of the Committee, as it is to be eventually organized on somewhat independent lines. The first catalogue of books is expected to be ready by January 1st. Public authorities, fire chiefs and authors having volumes they can spare are requested to address them to the chairman of the Library Managing Committee (Mr. James Sheppard), No. 1, Waterloo Place, London, S.W.

FIRE PROTECTION ON BOARD SHIP.

A SPECIAL committee of Lloyds has been looking into the question of ship fires, and they have particularly taken into account fires that occur when the boats are alongside quays.

Curiously, the Lloyds committee has solely considered the matter from the standpoint of fire extinguishing, and not from the fire preventive point of view, which relates to the fitting, equipment, construction, loading and administration of a ship.

Regarding the fire extinguishing aspect, the conclusions of the special committee are as follows:—

"That the frequent occurrence of fire on board ship, with the danger to life and the great destruction of valuable property which attend it, calls for the serious attention of the shipping community.

"That the use of water and steam as fire extinguishers, while frequently abortive, is almost necessarily attended by serious damage.

"That as vessels in port, both loading and discharging, are exposed to greater risk of fire than vessels at sea, whilst, on the other hand, when fire occurs at sea it is usual to make for port, fires on board ship fall in the majority of cases to be dealt with by port and dock authorities.

"That in view of the fact that scientific appliances are now available for extinguishing fires on board ship, especially on ships in port, promptly, effectually, and, as is believed, ordinarily without damage to ship or cargo, the principal home ports of the United Kingdom ought to be equipped accordingly; and that, if the provision of such scientific appliances were adopted at the ports of the United Kingdom, such an example would probably be followed at continental and overseas ports generally.

"That so long as the Port of London, the scene of many and disastrous ship fires, continues to rely on water as an extinguisher, it will be difficult, if not impossible, to induce other ports to initiate reform; and that this being so, no means should be spared to induce the London and India Docks Company to place their docks, in this important respect, on the level of modern requirements."

These conclusions are valuable, so far as they go; but we would strongly recommend Lloyds to take up the fire preventive side, which can materially influence the reduction of our fire waste in shipping.

As far as architects are concerned, the question of fire prevention on board ship mainly affects those occupied in the designs of the fittings and furnishings of modern liners, a subject which we are glad to see is nowadays frequently put into the hands of well-known members of the profession.

We think that where necessity compels the use of wood, only non-inflammable wood, or at least the Australian hardwoods, such as jarrah or karri, should be used in fitting up saloons and state-rooms, but that wherever possible wood should be done away with on these liners and preference given to Uralite and similar materials, which lend themselves well to panelling.

The question of reducing the number of fires on ships is of course one of national importance, and one controlled mainly by workers outside the architectural profession; but as far as the up-to-date liner is concerned we believe that there are quite a number of architects who could bring their influence to bear upon the serious question of reducing the unnecessary use of highly-inflammable woodwork of the soft-wood description on board ship, and for this reason especially we call attention to the consideration which is at present being given to fire protection at sea.



A SWISS FLOOR OF HOLLOW CONCRETE BEAMS AFTER 100 MINUTES FIRE TEST.

CONCRETE FLOOR BEAMS AND FIRE RESISTANCE.

HOLLOW concrete beams reinforced with iron rods and laid side by side so as to form a floor have recently been put on the market in Europe, and among the advantages ascribed to them are those of "fire resistance."

The question of concrete hollow beams is becoming such an important one that any advocacy as to their possible resistance against fire requires investigation before the description of "fire resisting" is accepted as a fact. We are glad to observe from the report of the British Fire Prevention Committee issued last year that they have taken

this matter up and have tested such hollow beams with the view of ascertaining the truth.

We have before us Publication No. 78 of the Committee, which deals with a floor of this description, and we reproduce verbatim the "object of the test" and the "summary of the test," together with two photographs out of the report. We think the "object" and "summary," read together, speak for themselves, more particularly when illustrated by the photographs. But we desire to take this opportunity of also pointing out the lesson to be learnt from the test in question. It is obvious to all who have followed the series of independent fire tests conducted by

the Committee that armoured-concrete floors must show considerable resistance against fire, but only if the metal-work—in the form of rods or wire—is sufficiently protected so as to prevent expansion when the heat is applied. In designing an armoured concrete floor or girder the designer tries to put his rod or wire as low down as possible, and forgets that by doing so he reduces the depth of the concrete which has to protect that rod or bar from expansion. Designers in ferro-concrete, armoured concrete and the like should make it an absolute rule that, so far as floors are concerned, no metal-work of any kind should be within 2in. of the soffit of the floor. Otherwise the term "fire



RUINS OF THE FLOOR.

resisting" will be a misnomer, and the results of independent tests will be as in this instance.

Object of Test.

To record the effect of a fire of two hours' duration gradually increasing to a temperature not exceeding 2,000 degs. Fahr., followed at the end of the two hours by the application of a stream of water for two minutes, and the consequent rapid cooling.

Note.—The area of the floor under investigation to be roofed, super. in the clear (10ft. by 10ft.). The load to be carried by the floor was 224lbs. per ft. super.

Summary of Effect.

After 65 minutes the floor began to sag and continued to sag.

After 100 minutes about $\frac{1}{3}$ of the floor collapsed with a portion of the load.

The remaining portion of the floor remained in position, and was sagged in the centre about 5 $\frac{1}{2}$ ins.

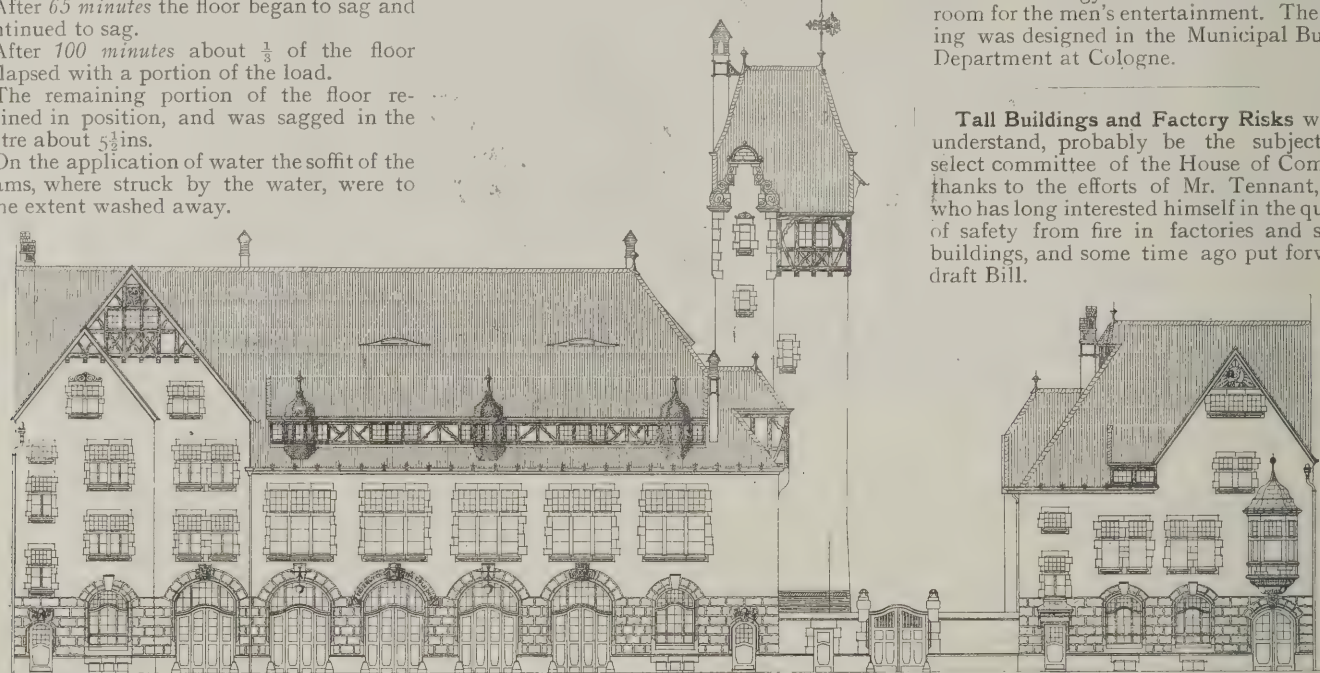
On the application of water the soffit of the beams, where struck by the water, were to some extent washed away.

A FIRE STATION AT COLOGNE.

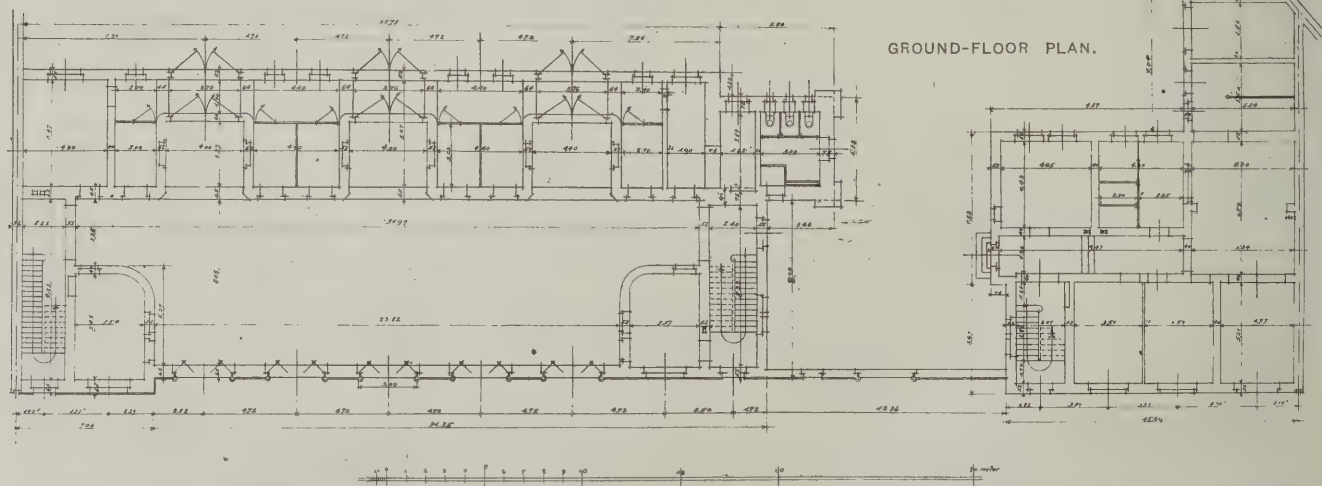
THE new fire station recently opened at Cologne is excellently situated to cover the area it has to protect. The main building is the station proper, and the other is utilized for offices and tenements. The main front of the station is on a broad thoroughfare, and at the back there is a large courtyard. The entire ground floor of the main building is occupied with the necessary equipment and horses for an immediate and simultaneous turn-out of three-horsed appliances. The appliances are so placed that

each carriage has its respective pair of horses on either side of it to the rear, but close to the back wheel. The intervening spaces between the horsed appliances are utilized for small gear, and later will be used for motor engines. The appliances returning from a fire drive in from the courtyard, i.e., not right through the station. There is a very clever arrangement of double folding-doors by which draughts are kept both from the station and from the stabling during this operation of driving in. The first floor is occupied by lofty watch-rooms and bedrooms for the men on duty. The high roof serves as a gymnasium and a common room for the men's entertainment. The building was designed in the Municipal Building Department at Cologne.

Tall Buildings and Factory Risks will, we understand, probably be the subject of a select committee of the House of Commons, thanks to the efforts of Mr. Tennant, M.P., who has long interested himself in the question of safety from fire in factories and similar buildings, and some time ago put forward a draft Bill.



FRONT ELEVATION OF THE COLOGNE DISTRICT FIRE STATION. HERR SCHMIDT, ARCHITECT.



GROUND-FLOOR PLAN.

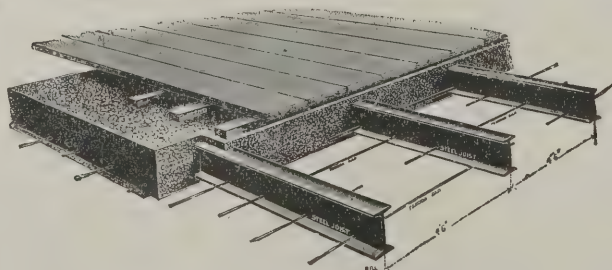
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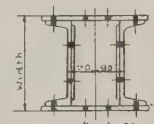
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17	2 500 L ^s 50-15 Kg 2 PLATES 360 x 16	332
18	2 500 L ^s 50-15 Kg 2 PLATES 360 x 15	324
19	2 500 L ^s 50-15 Kg 2 PLATES 360 x 10	320
20	2 500 L ^s 38-7 Kg 2 PLATES 360 x 10	320
21	2 500 L ^s 35-3 Kg 2 PLATES 360 x 10	320
22	2 500 L ^s 35-3 Kg 2 PLATES 360 x 8	316
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25	2 N.P. 50 L ^s 4 PLATES 360 x 20	380
8	2 500 L ^s 60 Kg 4 PLATES 300 x 22	388
9	2 500 L ^s 60 Kg 4 PLATES 300 x 10	388



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THE FRENCH GOVERNMENT BUILDING: FORESTRY BUILDING BEHIND.



PALACE OF VARIED INDUSTRIES (VAN BRUNT AND HOWE, ARCHITECTS), AND THE LOUISIANA MONUMENT (E. L. MASQUERAY, ARCHITECT).



PALACE OF THE FINE ARTS (CASS GILBERT ARCHITECT).



PALACE OF MANUFACTURES (CARRERE AND HASTINGS, ARCHITECTS) AND THE LOUISIANA MONUMENT.

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THE

BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

November 30, 1904. Vol. 20, No. 512.

6, Great New Street, Fetter Lane, E.C.

Summary.

The St. Louis Exhibition closes to-morrow, December 1st. All the buildings are to be demolished, except the Fine Arts Palace, which has cost £250,000. (Page 284.)

An American type of crane—new to this country—is being used for erecting the steel-work at the Ritz Hotel, Piccadilly, the feature of which is that the vertical mast is stayed by guy ropes, and the jib works around the complete circle. (Page 286.)

Mr. Glover, past-president, has given another £1,000 to the Northern Architectural Association. (Page 291.)

Dr. Waldstein advocates the establishment of a school of architecture at Cambridge University. The cost of maintaining it is put at £400 a year. (Page 288.)

In building the British consulate at Seistan, in Persia, all the timber, joinery, fittings, &c., had to be taken by camels on a two months' journey across a desert. (Page 293.)

In large towns like Bradford and Glasgow the cost of electricity is £8 8s. per horsepower for a working year of 2,700 hours. (Page xv.)

At the Architectural Association last Friday, Mr. Micklethwaite gave an excellent account of the development of Westminster Abbey, illustrating his remarks by a series of sections of the building pinned over one another. Mr. Warren read a paper on the excavations recently made at Westminster on the course of the mill-stream which was once a branch of the Tyburne. Among the finds is a Purbeck marble shaft from the shrine of Edward the Confessor in the Abbey. (Page 293.)

The proposal to legalize "peaceful picketing" is characterized as futile and useless. (Page 287.)

In a paper on "The Building Surveyor" which he read before the Surveyors' Institution on Monday night, Mr. C. John Mann said that between sixteen and seventeen was the best age for a pupil to enter a surveyor's office. He should be bound for four years, and in some respects it was an advantage for him to spend a year in the shops of a first-class builder or on some building during its erection. (Page 289.)

A very able book on the subject of decorative tiles and faience has been published. The author urges the desirability of architects stipulating for leadless glazes. (Page 292.)

In testing the strength of timber it is very important to determine the quantity of moisture in the wood: 15 per cent. is given as a standard. (Page 290.)

The Nile Dam and Submerged Temples.

MR. SOMERS CLARKE, the well-known architect, in a letter to the "Times" relieves the anxiety which existed among archæologists and students of Egyptian architecture respecting the effect of the latest proposal of the Egyptian Government—to increase the height of the Assuan dam—upon the remains of temples, &c., whose foundations are below the proposed water-level. It will be recollected that when the dam was projected it was known that the floor of the picturesque temples on the island of Philæ would be submerged. Precautions were taken by the Government to do as little harm as possible. Mr. Clarke says: "So far as we can tell at present, the substance of the masonry immersed, which, it must be remembered, has stood perfectly dry for some 2,000 years, has not received any harm. The surface, tinted by time and sunshine to a warm golden colour, is now washed to a cold grey. The painted surfaces are fast losing their colour. Not a little of the picturesque charm and beauty of the ruins is gone for ever. Foreseeing the danger that must come, the Government has caused to be made very careful examinations of the ruins. It has published the results, with maps, plans, sections and a multitude of excellent photographs. It has caused the foundations of the various buildings to be examined and, at a cost of some £18,000, to be carefully and thoroughly underpinned and supported." The proposal now to raise the level of the water another 20ft. means that the Kiosk, or Pharaoh's Bed, as it is called, will stand in water up to the necks of the capitals of the columns. The long ranges of the colonnades lying south of the central group of buildings will be completely hidden under water. Even the doorway between the towers of the southern pylon will be closed. The Mammesium and opposite colonnade will be submerged. The water will rise to the necks of the capitals in the Hypostyle Hall. The roof will consequently stand above the water; but the cornices of the rest of the temple will hardly emerge. Mr. Clarke thinks that, judging by the evidence of the past two years, it may reasonably be expected that the stonework of the walls and columns will not crumble away under the influence of further immersion, but he considers that the result upon the architraves and horizontal roof slabs, many of which will lie soaking for weeks under the water, may be disastrous, and he urges they should receive the same attention that has been given to the rest of the structures, in which case it seems

quite probable that the buildings on the island may survive for an indefinite period. As proof of his belief Mr. Clarke instances what happened about four years ago at the Temple of Edfu. A rainstorm of unusual duration occurred in the Nile Valley and it was very persistent at Edfu. The immense roof slabs of the temple became charged with water, and several of them broke in two, falling with a crash on to the pavement. The damage caused by the additional body of water in the reservoir goes far beyond the mere immersion of the island of Philæ. The floor of the Nile valley for about 100 miles south of Philæ will be more or less affected. Here are several temples, some of much interest and dignity, also a considerable number of sites of ancient settlements which have never yet been properly examined. Mr. Clarke assures us that the Egyptian Government is by no means indifferent to these things, and he states, on the best authority, that the matter will be thoroughly examined with a view to taking steps that as little harm as possible under the circumstances shall be done to the temples.

Our Fire Supplement.

It is with great satisfaction we are able to state that the special fire supplement included with last week's issue has met with hearty approval in all quarters. It is recognized as a valuable addition to our Journal, and the numerous expressions of approval it has called forth augur well for its future. The next fire supplement will be given in our issue for December 21st. It will be very fully illustrated by photographs and drawings, and, as before, the articles will be essentially practical and instructive.

Events of the Year.

WITH the issue for December 28th we shall publish a fully-illustrated supplement dealing with the architectural and building events of 1904, and in compiling it we request the aid of readers throughout the country. We have of course our regular channels of information, as well as correspondents in various towns, but it is necessarily difficult to keep in touch with all the multitudinous developments that are going on throughout the Kingdom, so that we shall esteem it a favour if readers will furnish brief particulars of any special events in their own localities which have not been made generally known, and especially we should be glad to have photographs of buildings erected or begun during the year.



ST. LOUIS EXHIBITION: THE BRITISH GOVERNMENT BUILDING. ERNEST GEORGE, ARCHITECT.

BUILDINGS AT THE ST. LOUIS EXHIBITION.

IN former issues—June 25th and October 15th, 1902—we have described the inception, development and erection of the buildings of the St. Louis Exhibition, so that there is no occasion now to repeat the general facts; it is opportune, however, to give a few particulars of those buildings here shown by means of photographic reproduction. Taking them in the order given, it may be mentioned that the British Pavilion is a reproduction and adaptation of Wren's banqueting hall (sometimes called the Orangery) at Kensington Palace. It has been erected from the designs of Mr. Ernest George—Messrs. George Trollope & Sons being the builders—and is understood to have cost about £20,000. It is not a plaster "staff" building, but one of solid construction. The banqueting hall is finely panelled and has an enriched ceiling, and the furniture comprises reproductions in keeping with the style of the building. There are also a Georgian room, an Adam room and a large room designed in Wren's style, with details from Hampton Court Palace and Belton House, further particulars of which will be found in our issue for April 13th last.

The United States Government building is the design of Mr. John Knox Taylor, the Government architect. It is 850ft. long by 250ft. wide, the columns of the colonnade being 5ft. in diameter and 45ft. high. The attic is 15ft. high and the height from the stylobate to the top of the attic is 82ft. The dome crowning the centre of the building is 93ft. in diameter and the top of the quadriga that surmounts it is 175ft. from the ground. Like most of the other buildings in the exhibition, it is of staff on a timber framework. The roof is carried by steel trusses of 175ft. span at 35ft. centres. The cost was £90,000. In front of this building are the Palace of the Liberal Arts (to the left) and the Palace of Mines and Metallurgy (to the right). The

former, designed by Messrs. Barnett, Haynes & Barnett, also cost about £90,000. It is 750ft. long by 525ft. wide. The architects have depended largely on sculpture for the decoration of the building, which is described as a severe treatment of French Renaissance. The main entrance is in the form of a hemicycle, with circular colonnades, the ceiling being frescoed on a background of gold. An allegorical processional frieze runs along the interior walls of the exterior loggias.

The Palace of Mines and Metallurgy (Mr. Theodore C. Link, architect) is quite an extravagant building compared with the studied correctness of the others. It has been a costly structure—£100,000. The length is 750ft. and the width 525ft. On three sides the walls are set back about 20ft. from the façade, leaving a space or loggia for certain exhibits, the base of the façade comprising sculptured panels illustrating the operations represented in the building.

The French Government building (see centre plate in this issue) is a reproduction of the Grand Trianon at Versailles, and is carried out with great taste and skill. The Palace of Varied Industries and the Palace of Manufactures face each other across a large space where the Louisiana Purchase Monument stands. In our issue for June 25th, 1902, we gave a detailed account of the construction of the Varied Industries building, together with a double-page illustration of the exterior, and the particulars there set forth serve for the methods adopted throughout the exhibition. This building cost £150,000. It was to have had a tower 350ft. high, but this was eliminated, like that of the Manufactures building. This latter, the architects of which are the well-known firm of Messrs. Carrère & Hastings, is an even more costly structure—£180,000. It is in the Corinthian order of architecture and has a main frontage of 1,200ft. with a depth of 525ft. There is an open colonnade on each façade. The Fine Arts Palace—£250,000—is the most costly of all the exhibition buildings, but it alone will remain when all the rest are taken

down. It comprises three massive sections, the central one being of brick and the others of brick, timber and staff. Mr. Cass Gilbert is the architect. Originally this building was to have been the focus of the exhibition, but the scheme was changed and it is now masked by the great Festival Hall with its flanking terraces and cascades; an alteration which gave rise to considerable dispute, Mr. Gilbert eventually bringing an action against the authorities for £9,000 for fees. We may note in conclusion that the exhibition commemorates the purchase of the Territory of Louisiana from Napoleon I., which took place on April 30th, 1803.

THE SESSION'S PRESIDENTS.

THE following are the presidents of the chief architectural societies in this country for the session 1904-5:—

Royal Institute of British Architects	Mr. John Belcher.
Royal Institute of the Architects of Ireland	Mr. George C. Ashlin.
Glasgow Institute of Architects	Mr. John Keppie.
Dundee Institute of Architecture, Science and Art	Mr. P. H. Thoms.
London Architectural Association	Mr. Guy Dawber.
Northern Architectural Association	Mr. J. W. Taylor.
Birmingham Architectural Association	Mr. Thomas Cooper.
Edinburgh Architectural Association	Mr. Harold O. Tarbolton.
Aberdeen Society of Architects	Mr. Artur Clyne.
Manchester Society of Architects	Mr. J. W. Beaumont.
Leicester and Leicestershire Society of Architects	Mr. H. Langton Goddard.
Bristol Society of Architects	Mr. G. H. Oatley.
Sheffield Society of Architects and Surveyors	Mr. T. Winder.
Leeds and Yorkshire Architectural Society	Mr. G. Bertram Bulmer.
York Architectural Society	Mr. Herbert Davis.
Liverpool Architectural Society	Mr. Philip C. Thicknesse.
Nottingham Architectural Society	Mr. A. W. Brewill.
Devon and Exeter Architectural Society	Mr. Charles Cole.
Cardiff, South Wales and Monmouthshire Architects' Society	Mr. Cholton James.



UNITED STATES GOVERNMENT BUILDING AND PALACE OF MINES AND METALLURGY.



ST. LOUIS EXHIBITION: VIEW LOOKING TOWARDS UNITED STATES GOVERNMENT BUILDING: PALACE OF THE LIBERAL ARTS TO THE LEFT, PALACE OF MINES AND METALLURGY TO THE RIGHT.



CONDITION OF WORK, NOVEMBER 2ND.

THE RITZ HOTEL.

THE photographs which we publish this week show the Ritz Hotel, Piccadilly, W., in various stages of erection, in continuation of the photographs, drawings and particulars we have already published in our issues of September 28th and November 2nd. In the latter issue we published a photograph showing one of the steel foundation cantilevers on its steel pin rocker, and we now give a view showing this same cantilever and two others with their connections and the superincumbent "columns" (the American term for stanchions) which weigh down the lever arms. It will be noticed that the cantilever in the foreground is secured to the "column" with rivets at its end and, in addition, by steel sections on top. The middle cantilever is not weighed down by a "column" as are the others, the "column" being stopped short on one of the floors above; the end of the cantilever had therefore to be secured by the girder as shown, the latter being secured to the outer "columns"—a rather difficult piece of design. The "columns" are not bolted down into the concrete bases, the bolts shown being simply used for the convenience of the erectors.

The view on page 289 shows, in addition to the general condition of the works on the date stated (when it will be seen the steelwork had just begun to arrive), a crane or "derrick" of the best British type, known as a "Scotchman," made by Messrs. William Morgan & Co., of Kilwinning, and a hand derrick. The former has been used since the commencement of the job for unloading and fixing the steelwork, and is admittedly highly efficient. The builders, however, had constructed an American type of derrick, the spars of which are to be seen in the foreground of the view we are referring to. This derrick is illustrated by two views on p. 288. It will be seen that the mast is kept in position by steel guy ropes and that the jib is shorter and works under these guy ropes and thus is enabled to travel entirely round the circle of 360 degs., being unobstructed by the legs, as in the British type. The power is derived from an engine in the basement, and the crane is worked round by men pushing a capstan arm. This type of crane is new to this country and is advantageous on large sites. A view on p. 288 shows the "Scotchman" and the hand derrick seen in the other view raised on the ground floor at

the Arlington Street end of the site. The view on this page, taken on the same date, shows the state of the steelwork looking the other way of the site towards the Green Park. Other views from the same point show the great progress made in two following weeks.

In view of the increasing use of steelwork in buildings in this country and the importation of American methods, we publish the "column plan" and "column schedule" for this job for the instruction of readers who are not acquainted with modern American

setting off the skew of the "columns"; these are in duplicate slopes of 100 and 300, the former being used for making calculations and the latter for preparing shop drawings for the steel manufacturers, who do not use templates but work direct. Each of the "columns" it will be noticed has a distinctive number assigned to it, which run forwards and backwards across the drawing in a zig-zag way to facilitate reference. Areas, shown on the drawing, were rather troublesome as regards the framing of the steelwork round them, and the "columns" had to be placed so as to suit. The "columns" were figured for concentric and eccentric loads; it may be specially noted that "columns" 65, 59, 57, 55, 52, 54, 37 and 35 are carrying heavy eccentric loads due to "columns" being stopped at the first- and second-floor levels, while the exterior "columns" have considerable eccentric loads due to the heavy exterior walls rendered necessary by the London Building Act. Special care has been taken to place the columns to allow of easy erection, a point that will be apparent to technical readers. The column plan was used for setting-out on the site and for detailing all floor beams.

The column schedule is consulted in the following way. Suppose we wish to know how any "column" at any floor level is built up: say it is number 24 on the "column plan," and we wish to know what the stanchion is on the fourth floor. We find the number of the "column" at the top of the schedule; we run down the compartment vertically until we stop opposite the line marked "4th floor" in the left-hand margin (where the vertical heights are shown), and we find a reference number 19. We consult the "key of sections" in the right-hand corner at the compartment number 19, and we see that the stanchion is built up of two channels 300 millimetres deep, weighing 50·13 kilogrammes per metre run, two plates



CONDITION OF WORK A WEEK LATER (NOVEMBER 9TH).

practice in structural steelwork design. The first shows the position of the different "columns," the dimensions being given in millimetres, in relation to the Piccadilly frontage as one axis or datum line and a line at right angles as the other. The dimensions on the return frontages are stated with regard to lines of interior columns for convenience in setting off, so as not to go outside the site. The small triangles which are drawn at the sides show the method of

measuring 360 millimetres by 10 millimetres, and that the width, measured as shown in the little drawing at the bottom right-hand corner, is 320 millimetres.

The design of the steelwork will be explained more fully as the job progresses by Mr. S. Bylander, the engineer responsible, who has made all the calculations, &c. For the moment we may say that the foundations are figured for dead load only, and a relative low pressure per square foot has been worked



RITZ HOTEL, PICCADILLY: CANTILEVERS AND FLOOR CONSTRUCTION (NOVEMBER 2ND).

to, in order to secure uniform settlement, if any. The live loads were neglected, as they do not come on until the job is near completion, by which time what little settlement there will be has taken place. The grillage beams in the "column" foundations have not had plates riveted on them, as is often the case in English practice, but three cast-iron separators were put between each pair of beams to stiffen them and keep them apart. The factor of safety used for beams has been 4, and the maximum deflection calculated for has been $\frac{1}{360}$ ths of the span.

Builders' Notes.

Royal Commission on Trade Disputes.—Before the Royal Commission on Trade Disputes and Trade Combinations last Thursday, Mr. W. Shepherd, official representative of the National Federation of Building Trade Employers and of the London Master-Builders' Association, gave evidence. He discussed the various proposals in the Bills of last session relating to trade disputes, and stated that peaceful picketing would be completely useless. When men were induced

to break engagements with employers it was from choice of evils and under extreme pressure of circumstances, and not by peaceful persuasion. Picketing could only be useful if it was intimidation and coercion, or bribery and corruption, and perhaps a combination of both. In every strike and trade dispute with which he had been concerned he had had to obtain police protection (to the limited extent which is allowed) for those of his workmen who were desirous of working; without this they could not have continued, but would have been effectually intimidated. One troublesome cause of dispute had been the question of demarcation of work, and as he had always stood out for his right to employ those he considered most suitable for the work, irrespective of the limitations made by the various trade unions, he had had serious trouble on several occasions, and his workmen had been subjected to almost unbearable interruption and annoyance, and frequently to personal violence. Mr. Alex. G. White, of the Lancashire, Cheshire and North Wales Building Trades Federation, also considered that to legalize the picketing of works, places of business, or dwelling-houses for the purpose of "peaceful persuasion" would be to perpetuate a public nuisance, and as it would be impossible to confine such picketing to peaceful methods against individuals, it would give opportunities for detailed intimidation which could be done secretly and would be difficult, if not impossible, to prove. This applied particularly to the building trades, where men were constantly sent out of the shop to outside and distant jobs in small numbers, sometimes singly.

Dissolution of Partnership.—Messrs. Fergusson & Starkey, builders' merchants, of Leicester, Kettering and Rushden, have dissolved partnership as and from October 31st. All debts due to and owing by the late firm will be received and paid by Mr. Fergusson.

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CONDITION OF WORK A WEEK LATER STILL (NOVEMBER 16TH).

AN ARCHITECTURAL SCHOOL AT CAMBRIDGE UNIVERSITY.

IN his inaugural address as Slade Professor of Fine Art at Cambridge University last Wednesday, Dr. Waldstein said he looked forward to the near future when opportunities would be given at Cambridge for the thorough and systematic study of the history of art, culminating in the establishment of an Art and Archæology Tripos, and also to the establishment of a school of architecture. He was one of those who maintained that the purpose of the University was, above all, theoretical and scientific in contradistinction to the practical and the technical. Yet he felt that the past had shown that the University would not lose its essential spirit by the introduction of some practical or technical subjects, while such professional studies would undoubtedly gain by their admission to the University. Of all the practical and professional aspects of art, architecture was the one which by its nature was most related to the work of a university. They had a thriving school of applied and mechanical sciences where the student of architecture could now learn much that would be of great use to him in his profession, as to stresses and strains, the properties of materials, metals and other matters; while the proper teaching in history and the history of art would do much—~~together~~ together with the general culture which a university ought to give—to make his sojourn of real use to him. He hoped that they might add to this a special school of architectural design where the student could be taught some of the work more specifically his own. They might thus hope to found a school of architecture. Such a complete school of art would not demand great outlay. To mention round figures, he believed that £600 per annum would suffice to supplement the teaching of art history, while £400 per annum would give them a school of architecture.



"SCOTCHMAN" CRANE AND HAND-DERRICK (NOVEMBER 2ND).



THE AMERICAN CRANE USED IN ERECTING THE STEELWORK AT THE RITZ HOTEL, PICCADILLY (NOVEMBER 22ND).

THE BUILDING SURVEYOR.

A MEETING of the Surveyors' Institution was held on Monday evening, when Mr. C. John Mann, F.S.I., read a paper on "The Building Surveyor: his Training and Practice." After referring to the increase in the building surveyor members of the Institution, and the inclusion of many branches of the profession under the general term "quantity surveyor," he went on to formulate the training of a youth. Some started in a builder's office or an agent's, or in some municipal office, afterwards making application to be examined with a view to becoming Professional Associates and subsequently Fellows of the Institution, but in such cases it was necessary to exercise close scrutiny in order that no irresponsible people should be so included. Between sixteen and seventeen was the best age for a pupil to enter a surveyor's office. He should come direct from school for a preliminary three months, and on signing articles he should offer himself without delay for the Preliminary Examination so as to become enrolled a student. Except under special circumstances, he should be bound for four years. In some respects it was an advantage for him to spend a year in the shops of a first-class builder or on some building during its erection, but this must not disturb his training as pupil with the surveyor; speaking

generally, Mr. Mann did not think there was time for this now, and the advantages to be gained were not unmingled with some disadvantages. By carefully regarding work in progress and taking every opportunity of following out details in the office and reading up special subjects, he would become conversant with construction and the work connected with the various building trades.

It was the practice of some people to place their sons for a short time, say twelve months or less, in several different offices, as, for instance, in the office of an estate agent, a builder, an architect and a building surveyor: but though these were often important well-known offices, he regarded it as a great mistake, for the youth could only occupy a very subordinate position in any of them, and he became a sort of Jack-of-all-trades and master of none. Having learnt the preliminaries, the student passed on to abstracting and billing. Here many neglected to take full advantage of their opportunities, particularly where the system of taking off was to complete each item of the work in every trade, with its consequent deductions, rather than to take off in separate trades. The careful and interested abstractor would look at each dimension and its description as he went on, and thereby learn the details of construction, with the relative sizes of the various parts making up the materials and labour connected with the whole of each item of the work. If time did

not permit this being done while abstracting, it could be done when the bills of quantities were finished, and perhaps sometimes before the drawings and specification went out of the office. This was not only a stepping-stone to taking off, but it also enabled the pupil to understand how to measure up works in progress.

A young man, having served his time and passed his P.A.S.I. examination in subdivision 3, would do wisely to remain in the same office in which he was trained or go to a good firm for a short time, but it was a matter for his own consideration whether he would do this or become a temporary assistant working hard, with frequent spells of semi-idleness, and gradually build up a practice for himself.

It was, of course, essential that he should familiarize himself with the numerous Acts and regulations affecting buildings, and he should keep himself well up in what was going on by reading the professional and daily papers and by attending meetings.

Quantities were now invariably supplied by the employer and were generally part of the contract, doing away with the necessity for the builders being represented in their preparation. In some cases the employer paid the surveyor direct, but more often he was paid through the builder. In any case the surveyor was always liable to have his work subjected to the most searching investigation by three persons, two of them experts, whose interests, in the ordinary nature of things, were opposed to one another.

At the present time there was a greater tendency among some builders to raise questions on the quantities than there used to be; which to some extent he thought was due to the quantities being (as now always) made part of the contract. It induced some builders to compare every item and description of the work as executed, and the smallest difference in the architect's details and instructions were carefully noted: and it induced an architect's zealous assistant to have a keenness for small omissions, where a little greater breadth of view on both sides would bring about quite as satisfactory a result with less friction.

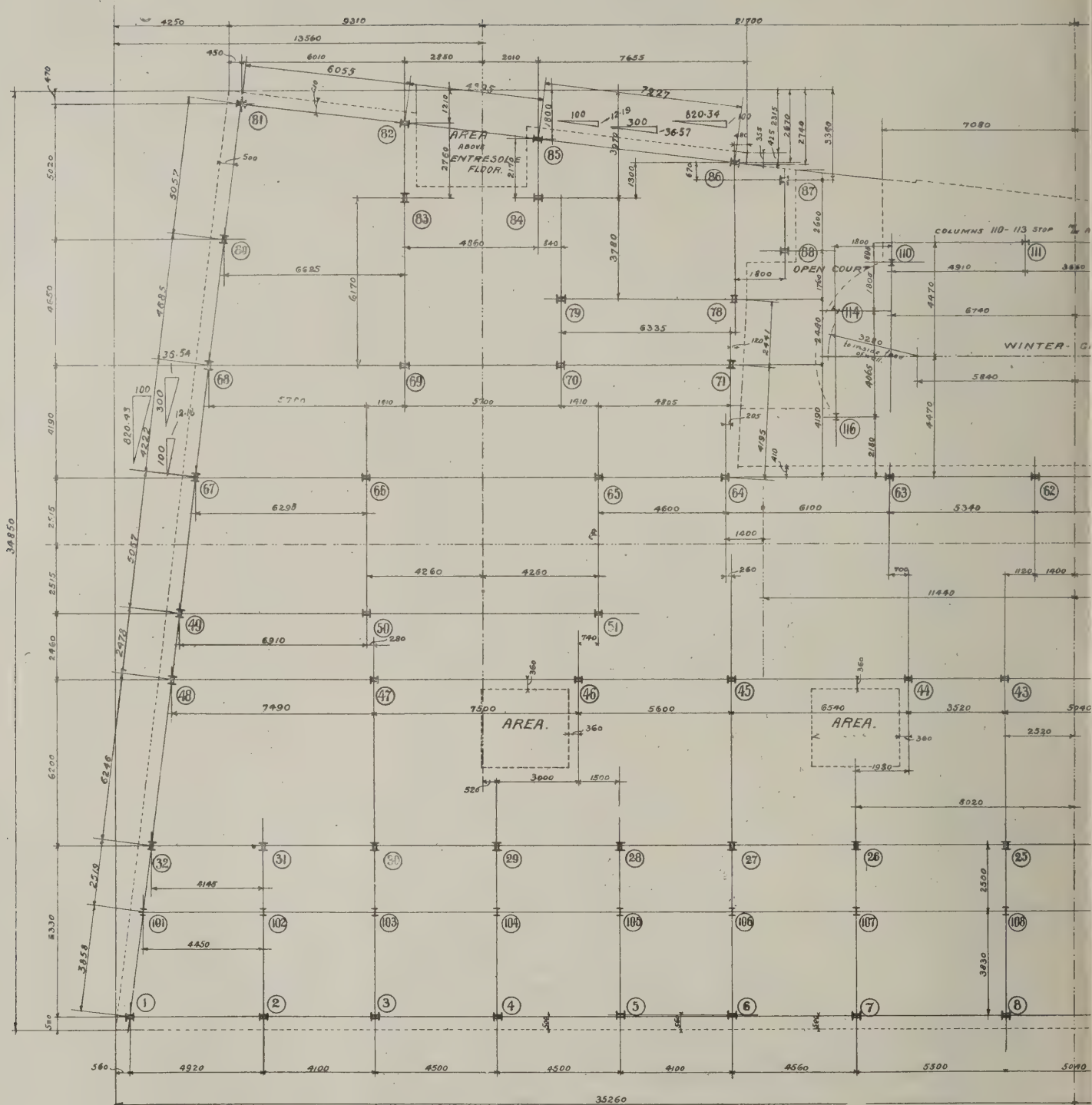
On signing a contract the builder deposited with the architect a sealed priced copy of the bill of quantities corresponding in all respects with that on which he made his tender, which was to form a schedule of prices for variations on the contract made during the progress of the work. Some thought this document should not be sealed, but Mr. Mann held that it should not be opened (except for the purpose for which it was deposited) without the consent of the builder and under certain restrictions; and he maintained that it would be well if, before the copy of quantities was sealed, the surveyor (who was in an independent position) could go through it for the purpose of dealing with any palpable errors in pricing, and for assurance that it was a correct copy of the original estimate.

The surveyor might also be called upon to approximately value portions of works executed and advise the architect as to the amount of his certificates for instalments. In cases where the builder became bankrupt the surveyor's responsibility was great; also in the matter of pricing and settling up the builder's account very responsible work was required of the surveyor. Sometimes, although the surveyor had taken out the quantities, the architect settled up accounts; but Mr. Mann did not think this to be best for the employer, as the surveyor was more fully acquainted with the details.

One of the most useful branches of the profession was that of surveying and reporting on the condition of premises prior to their being taken on repairing lease, while sanitary surveys and reports were, of course, frequently required by all sorts of clients.



THE "SCOTCHMAN" AT THE RITZ HOTEL WORKS, PICCADILLY (OCTOBER 14TH).

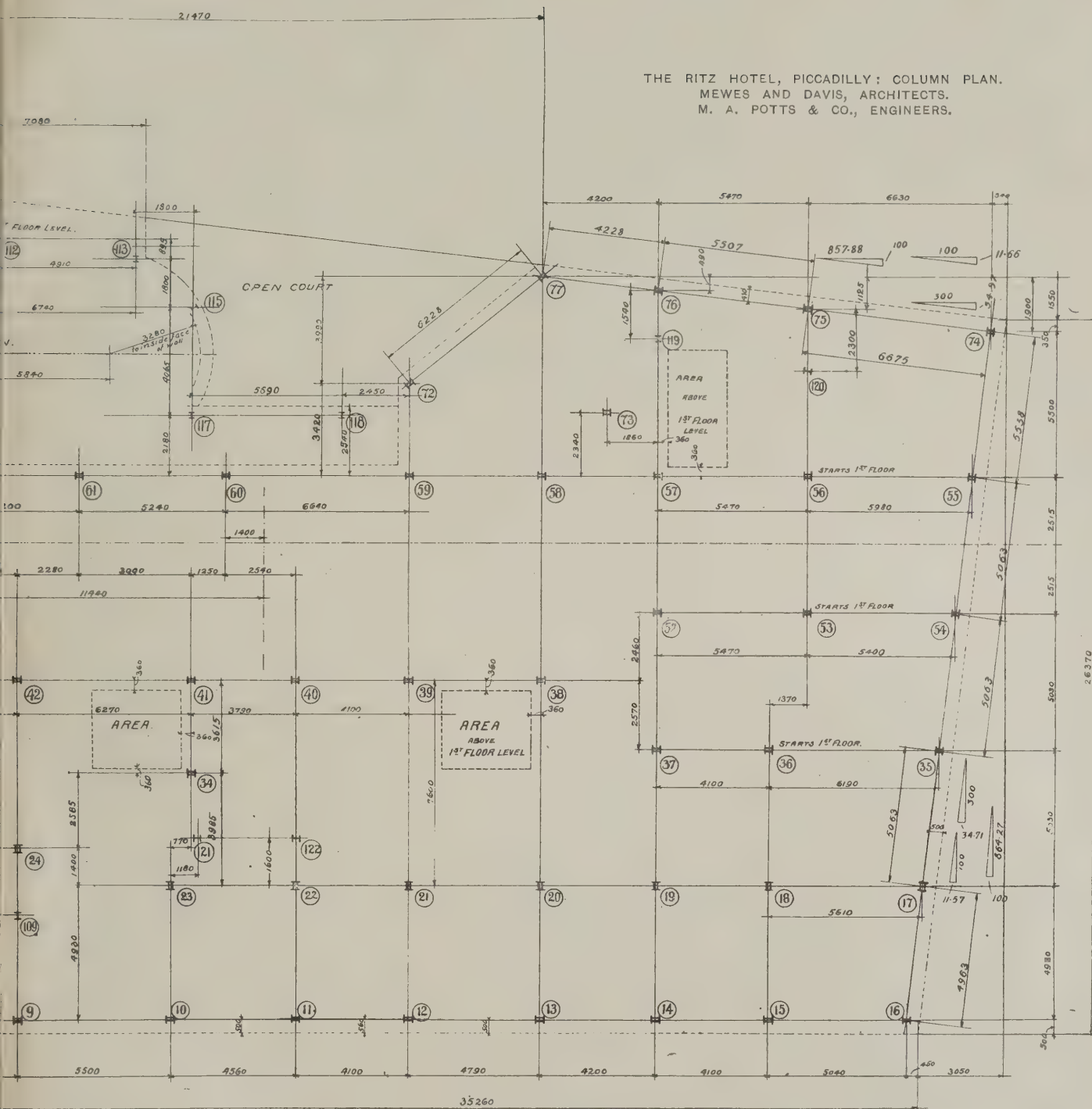


HOW TO TEST THE STRENGTH OF TIMBER.

IN the paper on "Timber: Its Strength and How to Determine It" which he read before the Dundee Institute of Engineers recently, Prof. T. Hudson Beare (Edinburgh University) said that although a very large number of experimental observations were to be found in the older text-books and in the proceedings of various technical societies, &c., many of these were unreliable. The unreliability was due mainly to the fact that no attempt was made to determine the moisture present in the timber at the time the test was carried out, and in very few cases were any data given as to the previous history of the timber, the age of the tree, the time of felling, &c. Professor Bauschinger, of Munich, made the first really scientific test

on timber between the years 1883 and 1887. Professor Bauschinger suggested that a standard of dryness should be adopted, and that 15 per cent. should be taken as this standard. He showed in his research that there was a definite numerical law connecting together the mechanical strength and the percentage of moisture present in any sample of timber. Proceeding, Professor Beare stated that the mechanical tests usually made upon timber in the Fulton Laboratory at Edinburgh University were tensile, compressive, cross-bending and shearing. He had carried out for the purpose of the lecture a number of tension tests on different kinds of wood in order to show how difficult it was to secure uniform results in tension experiments, and he showed, by lantern slides, how frequently a tensile bar would

give way by shear rather than by tension. After explaining other tests, he showed how much weaker timber was in compression across the grain as compared with its strength when tested with the grain. In conclusion, he stated that large timber beams frequently gave way not by cross-breaking but by shearing along near the neutral plane; the great weakness of timber to resist such shear stress was a matter of extreme importance and ought to be carefully considered when designing timber structures. All recent experiments on the mechanical properties of timber showed that the strength of timber was considerably affected by the ratio of the summer or solid growth to the spring or open growth in each annual ring, or, in other words, that the density or specific gravity was a very important factor.



NORTHERN ARCHITECTURAL ASSOCIATION.

President's Address.

THE opening meeting of the session of the Northern Architectural Association was held last week at Newcastle, the president (Mr. J. Walton Taylor, F.R.I.B.A.) occupying the chair.

Mr. Glover's Additional Gift of £1,000.

A letter was read from Mr. William Glover (past-president, who had given £1,000 consols and other valuable donations to the Association) in which he announced his intention to present another £1,000 for the purposes of (1) aiding the purchase of new premises, (2) the benevolent fund, and (3) Sir Aston Webb's scheme of education for architects.

The president in his address referred to

Mr. Glover's generosity. He said it was now definitely proposed to acquire new premises for the Association at No. 6, Higham Place, Newcastle (immediately opposite the Laing Art Gallery), and he suggested these premises should be named "The Glover Institute." The chief object for which the institute had been formed was the better training and equipment of architectural students. Speaking of consulting architects, he said that during recent years questions of light and air had been dealt with to a great extent by architects and surveyors who had made a special study of the subject, and their services were much in demand as expert witnesses. But there were many other subjects, such as questions of good planning and design, professional practice, &c., upon which most of them at some time or other

would be very glad to have the unbiased opinion of a brother architect, and for which they and their clients would gladly pay a fee. He hoped this subject would be ventilated at their Association meetings during the coming session. Another subject they ought to seriously consider was the safeguarding of sub-contractors against the non-payment of moneys due to them from the principal contractor. Dealing with the depression in the building trade, the president said there were not many indications of the general activity which they experienced three or four years ago; and this was not confined to one particular district, for unhappily the wave of depression seemed to be even worse in the south and midlands than in the northern provinces.—A vote of thanks was proposed by Mr. Bruce and seconded by Mr. Oliver.

Views and Reviews.

An Excellent Book on Faience.

This is indeed a notable book. The author deserves every support in his praiseworthy effort to decrease the danger of plumbism by the most convincing means of showing how glazes of the finest quality and of every variety may be obtained without resource to lead. This was the object of Mr. Furnival's former book "Researches on Leadless Glazes," which did great service for the china and earthenware industry by giving manufacturers reformed recipes. In the book now under notice Mr. Furnival seeks to do the same service for the tile and faience trades; and considering the increased manufacture of tiles and faience for structural embellishment, and that this branch of industry is being conducted by the use of even greater proportions of lead compounds in the glazes and enamels than that of china and earthenware, the book has a wider field of usefulness. Statistics show that while lead poisoning has considerably decreased of late years, owing to agitation and legislative action, there is still far too large an annual number of cases for us to feel secure, and indeed if there has been improvement it shows that we should not now relax our efforts but redouble them to win the last positions. This book is likely to be much more effective an instrument of reform than Mr. Furnival's former work, because it is so comprehensive in its nature, affording a complete record and review of the history and manufacture of decorative tiles, faience and mosaic. The subject is of course one of great importance to the architects of to-day by reason of the manifold directions in which we find glazed ware used, and the increasing employment of the material in modern architecture. Glazed surfaces have the merit of cleanliness, and modern sanitation has called for their extensive use both for interior and exterior work. In our large smoke-begrimed cities faience is more than ever looked upon as the most permanent means of gaining colour in streets, while glazed bricks are sought to give increase of light in restricted areas. There has been need for a good treatise on the subject of glazed structural ware, and this book adequately meets the need. It is a large work of 876 pages, printed in clear type and on good paper, with numerous illustrations, some in colours. Mr. Furnival shows how the architect can aid in preventing lead-poisoning by insisting upon the use of leadless glazes, which he clearly proves can give equal if not better results than those compounded with lead; for he traces the numerous uses to which glazed ware has been put in the past, its various beauties according to acknowledged authorities, and the technical methods of manufacture, and he shows how to introduce leadless glazes without impairing efficiency in any direction. Mr. Paul Waterhouse, M.A., F.R.I.B.A., in his paper before the Royal Institute some years ago, referred to the architect's part in preventing lead-poisoning, and if architects generally were to trouble themselves only slightly in the matter they could quickly effect a great reform.

Mr. Furnival commences with a historical review of decorative tilework and chromo-faience. He takes the reader rapidly but thoroughly through the various branches of the art as evidenced in Babylonia and Assyria, Egypt, Greece, Rome, Roman Britain, Persia, Syria, Rhodes, Saracenic empire, Turkey, Spain and the Moorish empire, India, China, Mediæval England, Mediæval and Renaissance Italy, Renaissance Germany, and Mediæval and Renaissance France, concluding with Delft ware. In the next chapter the author traces the rise of the modern industry in decorative tiles, showing in a masterly way the endeavours of noted

manufacturers abroad and at home, and the improvements they effected.

In the fourth chapter the sources and preparation of the clays, materials and colourants are dealt with, and here some extremely interesting and useful photographs and reproductions show the mixing and working of the clay in its various stages. This chapter is a very thorough account of the chemistry of clays, and gives in a very clear and short form an idea of the intimate relations of the different factors which require attention in the successful manufacture of a tile. The fifth chapter deals with ceramic pyrometry—a subject of great moment to the manufacturer. Chapter 6 treats of blue and red floor quarries, and chapter 7 of plain and encaustic floor tiles and tesserae. Chapter 8 deals with mosaic pavements and mural decorations, chapter 9 with the composition of glazing tile-bodies, chapter 10 with underglaze decorated processes, and chapter 11 with leadless glazes and enamels, in which numerous recipes are given. The next subject taken up, in chapter 12, is the application of the glazes and enamels, and, in chapter 13, on-glaze decorative processes. In chapter 14 the architect is particularly concerned with the subject of constructional faience and enamelled terra-cotta and likewise, in chapter 15, colour, design, drawing and estimating. Appendices give (1) the rules of the manufacture and decoration of earthenware and china under the Factory and Workshop Acts; (2) a series of suggestions for setting tile as officially compiled by the Tile Manufacturers of the United States of America, 1900; and (3) notes on the tile decoration found on buildings in Punjab and Bengal, by Mr. J. H. Marshall, Director-General of Archaeology for India. From this brief account it will be realized that the book covers an immense range. The author acknowledges his indebtedness to many sources for his facts and particularly to information on the use of glazed tiles and faience in China furnished by Dr. Stephen W. Bushell, author of "Oriental Ceramics," a list of the principal existing monuments in India upon which tilework decoration appears, furnished by Mr. C. Stanley Clarke, of the Indian section, Victoria and Albert Museum, and notes on designing for ornamental tilework and faience by Mr. Ambrose Wood, of Hanley. Mr. Furnival has received assistance from authorities in every branch of his subject, and the book is therefore a compendium of the most trustworthy information. In conclusion we can only say that we far too seldom receive books connected with architectural subjects that display such care and knowledge as this one.

"Leadless Decorative Tiles, Faience and Mosaic, comprising notes and excerpts on the History, Materials, Manufacture and Use of Ornamental Flooring Tiles, Ceramic Mosaic and Decorative Tiles and Faience, with Complete Series of Recipes for Tile Bodies and for Leadless Glazes and Art-tile Enamels," by William James Furnival, Honours Medallist in Pottery and Porcelain of the City and Guilds of London Institute. Stone, Staffordshire: W. J. Furnival. Price £6 6s.

Obituary.

Mr. G. H. Holt, civil engineer and architect of Blackburn, died recently at the age of fifty-seven.

Mr. William Freeman, architect, of Hull, died on November 17th. More than 200 chapels were erected from his designs.

Dr. G. Vivian Poore, consulting physician to University College Hospital, died at Andover last Wednesday. He was widely known as an authority on sanitary matters.

Treads of Different Widths.—A correspondent draws attention to the danger of making front doorsteps with treads of different widths. Many a broken limb is caused through bad stair or ladder arrangements.

Keystones.

For Council Schools at Stockport, Messrs. Cheers & Smith, architects, of Blackburn, have been selected in competition.

The Plenum System of Ventilation has been adopted for the extensions to Bradford Town Hall, now being carried out under the direction of the city architect.

Mr. Philip C. Thicknesse, president of the Liverpool Architectural Society, has been elected a Fellow of the Royal Institute of British Architects under the proviso to by-law 9.

New Y.M.C.A. Institute, Paisley.—Mr. M. T. Graham Abercrombie, of Paisley, is the successful architect in the competition for this building, estimated to cost between £10,000 and £12,000.

Sir William Grantham's Cottages.—The Chailey Rural District Council has decided to take proceedings against Sir William Grantham for beginning to build a cottage at Barcombe before the plans had been passed.

Tagg's Island, Hampton Court, is to be offered for sale by auction on December 1st. The Island Hotel and the boathouses are also to be sold, as well as the Hampton Court Club and the boathouses adjoining.

Institution of Heating and Ventilating Engineers.—Mr. George Crispin (of the firm of James Crispin & Sons, Bristol) has been elected president of this institution for the current year. The summer meeting will be held in Bristol in July.

The City Surveyorship.—The twelve candidates selected for this post (see p. 259 of our issue for November 16th) have now been reduced to the following five:—Messrs. F. Brown, J. E. Crouch, S. Perks, G. W. H. Prescott and F. Sumner. The appointment will be made on December 15th.

Competition Reform Society.—The committee disapproves of the conditions in the competition for new police and fire-brigade stations at Bristol because there is to be no professional assessor, the premiums are insufficient, and no guarantee is given that the successful competitor will be entrusted with the work. Members are requested to abstain from competing unless the conditions are satisfactorily revised.

Competition for St. Paul's Church, Glasgow.—Mr. John M'Intyre, of Edinburgh, has been awarded the first premium for his design for the new St. Paul's Church, Glasgow, which is to be erected in John Street, with frontages to Little Hamilton Street and Margaret Street. The governors of the Glasgow and West of Scotland Technical College paid £15,000 for the old building, with the object of still further extending their new premises being built in George Street. Of that sum £5,000 was expended on a site for the church and the balance of £10,000 on the building. Messrs. Beattie & Morton, of Glasgow, were awarded the second premium in the competition and Mr. James M. White-Halley, of Chelsea, the third.

Architects' Registration.—In his presidential address to the Leeds and Yorkshire Architectural Society, Mr. G. Bertram Bulmer, F.R.I.B.A., said he could well understand that some of those eminent architects who did not favour registration were unable to see eye to eye with those who advocated it. "They are like the illuminated capitals at the head of a paragraph—they adorn and beautify it. We are the block type which expresses its meaning and substance—the pith and marrow of it." He trusted the day was not far distant when they might see the profession represented by a president of the R.I.B.A. elected from the provinces as an outward and visible sign of the goodwill and appreciation of their London brethren.



THE CONSTRUCTION OF DOMED ROOFS IN PERSIA.

HOUSE BUILDING IN PERSIA.

THE building of the British consulate at Seistan, in Persia, due west from Quetta (the capital of British Baluchistan), was a work of considerable difficulty, as mud is the only building material in the locality; hence all the timber, joinery, fittings, &c., had to be taken by camels on a two months' journey across a desert. When operations at last commenced, a kiln was erected and bricks were made in a primitive manner. Labourers mixed the earth and water with their feet till the mass was of the consistency of clay, then passed it through a wooden frame 8 ins. square by 2 ins. deep, and thus turned out bricks about twice the size of our own bricks: three men making 2,000 in a day. In the hot weather the bricks were baked dry by the Seistan sun in twenty-four hours, being ready for the kiln on the second day, remaining there for three days, and then allowed to cool for two. When burnt the bricks are white. The only fuel obtainable at Seistan is brush-wood, and it takes fifty coolies one week to collect enough for a single kiln. The process of roof-building is very interesting. All roofs are domed. Generally two masons begin the dome at different corners of the room and work towards each other. Each mason has under him two assistants and five coolies, the former laying the bricks, while the latter throw up supplies from the ground. When about twenty layers are completed, the masons begin work at the two opposite corners of the room, and gradually the dome closes in over their heads until there is only an aperture at the top 8 ins. square, which is left open to allow smoke to escape and admit light. On the completion of the domes the whole building is—in the case of mud-brick dwellings—plastered on the outside to protect it from rain. The plaster consists of chopped straw, horse-dung and mud. The same material is also used for the interior walls of the house, and, until dry, emits a very offensive smell. In the houses of the more wealthy this plaster is covered with a beautiful white composition, which is worked up into many artistic designs. This is known as "getch" work. It is interesting to note how these houses in Persia are ventilated and kept cool in summer time. On the roofs facing north a screen of mud is built with the object of directing the breeze into a shaft leading to the dwelling-rooms below, but this has the disadvantage of admitting sand and dust as well, and it is generally used on the poorer class houses only: the richer classes construct a kharkhāna, which is a primitive kind of water-screen. An opening as big as a large doorway is made in

the north wall of the house, and filled in with freshly-gathered camel-thorn attached to a wooden framework. A tank of water is dug on the outside, and two men are employed to throw bucketfuls of water on the screen.

[The foregoing particulars are gathered from an article which appears in the November issue of "The World's Work," to whom we are indebted for the accompanying illustrations.]

THE ARCHITECTURAL ASSOCIATION.

A MEETING of the Architectural Association was held on Friday evening at 18, Tufton Street, Westminster, the chair being occupied by the president, Mr. E. Guy Dawber, F.R.I.B.A.

The following were elected members of the Association:—Messrs. F. G. Brooker (London), W. H. C. Tryon (Epsom), R. A. F. Guimaraens (Ealing), A. St. H. Brock (North Cheam), F. W. Langman (Notting Hill), F. V. Longstaff (Wimbledon) and W. B. Medlicott (London).

Further donations to the Building Fund were announced as follows:—

	£	s.	d.		£	s.	d.
John Murray	105	0	0	W. H. Scrym-			
H. L. Florence	50	0	0	gour		3	3
T. Elsley	21	0	6	A. C. Galbraith		2	2
A. N. Prentice	10	10	0	P. W. Lovell		2	2
C. Hodgson				W. L. Lucas		2	2
Fowler	5	5	0	Arthur Bolton		1	11
Theo Moore	5	5	0	F. H. Crawley-			
H. S. Noblett	5	5	0	Boevey		1	1
P. E. Filditch	5	5	0	J. S. Gibson		1	1
W. Woodward	5	5	0	C. R. G. Hard-			
Sir A. Blomfield				ing		1	1
& Sons	3	3	0	T. S. Inglis		1	1
G. Watson	3	3	0				

The following members have promised to double their annual subscriptions until the building debt is cleared:—Messrs. S. Chatfield Clarke, W. E. Davis, E. Guy Dawber, Henry T. Hare, Arnold Mitchell, E. H. Sim, B. N. Southall, A. H. Ryan-Tenison, M. E. Webb, Louis Ambler, Arthur Bolton, W. G. R. Bousfield, C. H. Brodie, F. Dare Clapham, A. O. Collard, G. Hubbard, J. K. Hunter, H. P. G. Maule, L. Simmons and A. D. Smith.

A vote of condolence with the relatives



INTERIOR OF DOMED ROOFS.



CENTRAL OFFICE OF THE NATIONAL BANK OF SOUTH AFRICA, IN COURSE OF ERECTION AT JOHANNESBURG.

of the late Mr. John Norton (president of the Association in 1858) was passed, after which it was announced that on Saturday, December 3rd, a visit would be paid to the theatre being erected in Charlotte Street, Tottenham Court Road, from designs by Mr. Frank T. Verity, members to meet at the building at 2 p.m.

Mr. Micklethwaite on Westminster Abbey.

Mr. J. T. Micklethwaite then gave (extempore) an authoritative, though brief, account of the development of Westminster Abbey, illustrating his remarks by sections of the building, pinned over one another so as to show the church as it appeared at the several stages of its development. As Mr. Micklethwaite explained, its original foundation is legendary, but we have accounts proving that an already old abbey—probably 200 years old—stood on the site in Edward the Confessor's time, and it was Edward who began the building of an unusually large foundation there. We know where it stood, and we also have a good idea of what it was like. In effect, it was a choir added on to the old church which formed the nave. At this point Mr. Micklethwaite took occasion to point out that there was no sharp division between so-called Saxon and so-called Norman architecture; William did not bring over the Norman style in his pocket, with the result that it immediately replaced Saxon work; there was "Norman" in England before the Conqueror and "Saxon" after his

arrival; and, as a fact, the one grew slowly out of the other. Edward the Confessor made a start with a new style (about 1050), but nothing of his church remains in the existing building except a few bases under the sanctuary floor. Edward's successors built the nave in the twelfth century, carrying on the Confessor's design, with alterations (chiefly zig-zags and "lollipops") in the details and carvings. In 1225 Henry III., then a boy, laid the foundation-stone of a Lady chapel at the east end, and a good deal of the remains of it exist under Henry VII.'s chapel: this work was not organized by the king, but carried out by subscription, as was usual in those days. Twenty years later, however, Henry himself took in hand the rebuilding of the choir—the piece we now have. This was finished in 1260. So the church remained until the middle of the fourteenth century, no rebuilding taking place, except alterations to the windows, as at Norwich and Peterborough. Later a considerable amount of money was forthcoming and the monastery and old nave were rebuilt, but the abbey remained in a very unfinished state till the end of the century (1500), the work then done bringing us to the second completion of the building. Finally the Lady chapel was pulled down and the chapel of Henry VII. erected (1503-12).

Mr. Warren on Excavations at Westminster.

A paper by Mr. E. Prioleau Warren on the recent excavations at Westminster was read

by Mr. Louis Ambler, in Mr. Warren's absence. Illustrations were shown of the bridge—or rather the brick culvert between two stone abutments of a demolished bridge—which had been uncovered at the corner of Tufton Street and Great College Street. The brickwork appeared to be of seventeenth-century character. The water-course spanned by the bridge was one branch of the Tyburne, which took its rise in Hampstead. It had long since been diverted from its natural course in Great College Street and now ran into the pond in St. James's Park and into various sewers. Great College Street forms the southern boundary to the garden of Westminster Abbey, and the Abbey Mill that stood on the river bank at the southern end of the present Victoria Tower Gardens was in all probability worked by automatic flood gates, which admitted water as the tide rose and held it back as the tide fell. Despite confident statements which had been made, Mr. Warren said that a study of old maps and plans showed the stream was of no great width, and boats and barges could only have passed at high tide by some side creek or lock, not indicated on any maps or plans he had seen, and in the recent demolitions of buildings in Great College Street, and the subsequent excavations, nothing in the nature of quays or wharves, nor fragments of any boats or apparatus of that sort, had been discovered to warrant the supposition that the stream was navigable. In the excavations on the site extending between Tufton Street (formerly known as the Bowling-alley) and Barton Street a large number of objects, pottery, spoons, knives, &c., mostly of the seventeenth century, had been found, together with a portion of a Purbeck marble shaft, which he believed to be from the north-eastern angle of the Confessor's shrine, as it exactly fitted that position. The smaller objects found were exhibited at the meeting.

A vote of thanks was proposed by the Dean of Westminster, who expressed special indebtedness to Mr. Warren and his two assistants for having rescued the portion of the shrine of St. Edward—a priceless possession now in our proper keeping, though in other circumstances it might perhaps have found its way to an American market.

Mr. W. D. Caröe seconded the vote of thanks. Speaking of Mr. Warren's paper, he said he felt sure the mill stream was navigable, and in support of his contention he exhibited the end of a barge pole and a boat-hook which had been dug out beneath the foundations of the Georgian buildings formerly on the site, but now pulled down to make way for new erections; he also exhibited some bowls used at the bowling-alley in Tufton Street, of which mention had been made. Westminster Abbey, he said, was one of the best preserved and most interesting buildings in Christendom.

A resident spoke of the new buildings which had been erected in the locality, characterizing them as atrocious, and he urged that the Westminster County Council and the London County Council should appoint a permanent committee of architects with power to condemn buildings architecturally bad and incongruous.

Mr. Francis Hooper asked Mr. Micklethwaite whether it was a fact that a Roman temple had originally stood on the site of Westminster Abbey.

Mr. Dawber, referring to the papers read that evening, said it was a great mistake to confine themselves to practical everyday things: they should take up archaeology, especially when the Abbey—one of the most interesting buildings in the world—was so close at hand. Speaking of the numerous objects which had come to light in the excavations at Westminster, he said that some society should be formed to gather and store such things in a museum. In the City this was to some extent done at the Guildhall,

but even there he himself knew of several instances where the objects found had gone into private keeping.

Mr. Mickelthwaite, replying, said that he had seen some materials with Roman mortar attached to them thrown up when some excavations were made in the cloisters of the Abbey years ago, and in the vestry to the chapter-house there was a stone, formerly outside, which had every appearance of being Roman; it was said to be a Roman milestone; so that it was probable a Roman temple did once occupy the site, perhaps dedicated to Augustus, as some thought. He pointed out that although alterations and rebuildings were continually going on, the Abbey was always in use, and this accounted for certain differences in the building, the alterations having been made with the endeavour to disturb the monks as little as possible. Referring, in conclusion, to the substitution of new piers, &c., below towers, he said this was to be seen especially at Ripon and York, there being at the latter a piece of the Norman tower above the Perpendicular work below.

The president announced that a special general meeting would be held on Friday, December 9th, at 7.15 p.m., to sanction an alteration in the by-laws to the effect that "The Association shall not make any dividend, gift, division or bonus in money unto or between any of its members"—this for the purpose of claiming exemption from the local rates. On the same evening, at 7.30, Mr. T. Raffles Davison would read a paper on "Some Architectural Reflections."

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

The Orangery, Kensington Palace.

LONDON:—STUDENT writes: "Where can I find measured drawings of the Orangery at Kensington Palace?"

A measured drawing to a small scale, and two plates, appear in Belcher's & Macartney's "Later Renaissance in England," vol. i. M.

Rebuilding and Ancient Lights.

MANCHESTER.—F. J. A. writes: "Is it legal for a builder named Brown on accompanying sketch (not reproduced) to rebuild and increase the height of his building? The roadway between Brown and Jones opposite is 30ft. wide. Brown's present building is 18ft. high in part and 27ft. for the rest. Jones has had his present light for well over twenty years. Can Brown rebuild up to 30ft. in height, i.e., within the angle of 45 degs. from Jones's lowest window, which is at ground level, or must he keep to the old height?"

Brown may not increase the height of his building if in doing so he materially interferes with the light of Jones's window. The question as to what constitutes material interference with light is one which it is in the hands of the court to decide in each particular case, but as a rule it is considered that where a street intervenes between the new building and the light it is against public policy to prevent rebuilding to a reasonable height, and really substantial interference would have to be shown by Jones before he could obtain an injunction against Brown to prevent him from doing what he wishes. In all these cases the best thing is for the two parties to come to a private arrangement, and I would suggest that Brown should approach Jones and make him an offer of some small sum of money as compensation for any possible injury which might be done to him, pointing out to him at the same time how unlikely he would be to succeed if he were to bring an action for damages.

G. A. T. M.

Gauge for Sheet Lead.

A. writes: "Is there a pocket gauge made by which the thickness and weight of sheet lead can be readily ascertained?"

I do not know of any gauge on the market for testing sheet lead, but it would be easy to make one after the style of the Birmingham Standard sheet iron gauge (B.G.) or the Imperial Standard wire gauge (S.W.G.), or the old Birmingham wire gauge (B.W.G.). The following table gives the weight and thickness of milled lead compared with the gauge number of the Standard sheet iron gauge (B.G.):—

Weight lbs. per ft. super.	Thickness in inches.	B.G. No.
1	0'017	27
2	0'034	21
3	0'051	18
4	0'068	15
5	0'085	13
6	0'101	11
7	0'118	11—10
8	0'135	10—9
9	0'152	8
10	0'169	8—7
11	0'186	7—6
12	0'203	6—5

HENRY ADAMS.

BUILDINGS IN JOHANNESBURG.

THROUGH the courtesy of "South Africa" we are able to give the two accompanying illustrations of new buildings for the National Bank of South Africa at Johannesburg. These serve to show the class of buildings now being erected in that growing town, and the steel framework construction adopted. Both of the buildings are provided with electric Otis elevators. The internal fittings were supplied by Messrs. Garvie & Sons, of Aberdeen. The central office adjoins the new premises of Messrs. Eckstein & Co., which is carried on a foundation raft of concrete and steel girders. Of many important buildings now completed or nearing completion in Johannesburg we may mention the new Stock Exchange, the Rand Club, newly-erected quarters of the General Mining and Finance Corporation, the Carlton Hotel, the Walter block, the new buildings of Messrs. Stuttaford, and Messrs. Harvey, Greenacre & Co.'s premises. The African City Properties Trust has just accepted tenders amounting to £47,500 for the erection of another large building, in Eloff Street, comprising a restaurant, shops and residential chambers.



NATIONAL BANK BUILDING IN JOHANNESBURG.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Petter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Abergavenny.—For the erection of a free library, reading room, &c., at the corner of Victoria Street and Baker Street. Mr. B. J. Francis, architect, Abergavenny:—

T. S. Foster, Abergavenny	£2,290
J. Edwards & Son, Monmouth	2,279
W. Bowers & Co., Hereford	2,098
C. Cooke, Hereford	2,050
J. G. Thomas & Sons, Abergavenny	1,990
H. Smith, * Wolverley, Kidderminster	1,888

* Accepted.

Brighton.—For the erection of artisans' dwellings in Tillstone Street, for the Town Council. Mr. Francis J. C. May, M.I.C.E., F.S.I., borough engineer and surveyor, Town Hall, Brighton:—

Fifteen houses, east side.

H. J. Penfold	£6,197
Hockley & Co.	5,975
Nye Brothers & Milledge	5,803
J. Barnes	5,710
J. G. Pickhard, Turner's Hill	5,710
Rowland Brothers, Horsham	5,198
W. Olliver	5,100
J. Pye & Co., Morecambe	4,900
J. & W. Simmonds	4,799
Sattin & Evershed	4,775
A. Cruttenden	4,750
H. A. C. Jay, Hove	4,650
Miller & Selmes, * 75, Tideswell Road, Eastbourne	4,495
T. Whillier	4,166

Fifteen houses, west side.

H. J. Penfold	6,432
Hockley & Co.	6,000
Nye Brothers & Milledge	5,999
J. Barnes	5,970
J. G. Pickhard	5,653
Rowland Brothers	5,400
W. Olliver	5,100
J. Pye & Co.	5,100
J. & W. Simmonds	5,108
Sattin & Evershed	4,885
A. Cruttenden	4,875
H. A. C. Jay	4,850
Miller & Selmes*	4,525
T. Whillier	4,166

[Rest of Brighton.]

Brimpton (near Newbury, Berks).—For the erection of a steel bridge, 84ft. by 18ft., called King's Bridge, near Newbury, for the Berks County Council. Mr. J. Morris, county surveyor, Reading:—

A. Findlay, Motherwell	£2,440	11	5
R. Moreland & Son, London	1,870	0	0
Cleveland Bridge Co., Darlington	1,668	13	11
A. D. Darnay, London	1,589	16	8
A. Thorne, London	1,587	0	0
Fulham Steelworks, London	1,575	0	0
E. C. & J. Keay, Birmingham	1,493	0	0
G. H. Tucker, Reading	1,349	0	0
McC. E. Fitt, Reading	1,338	0	0
E. Finch & Co., Ltd., Chepstow	1,333	17	2
Woods & Moir, London	1,307	0	0
J. Coulson, Stokes & Co., London	1,301	14	3
W. A. Baker & Co., Newport, Mon.	1,300	0	0
A. J. Ellis, Reading	1,275	5	0
J. Westwood, London	1,267	18	9
G. Thompson & Co., Birmingham	1,250	0	0
T. James, Brimpton	1,226	0	0
J. O. Brettell, Worcester	1,173	3	4
Needham & Lowe, Leicester	1,150	0	0
C. W. Cox & Sons, * Maidenhead	1,109	0	0

[County surveyor's estimate, £1,348 6s. 3d.]

* Accepted.

Chell (near Burslem).—For the enlargement of the workhouse, for the Guardians. Messrs. W. F. Slater, M.S.A., and W. H. Walley, architects, Burslem:—

W. Cook, Burslem	£11,940
J. Cooke, Wolstanton	11,900
W. Grant & Sons, Burslem	11,750
York & Goodwin, Tunstall	11,580
J. Broadhurst & Son	11,483
J. James, Smallthorne	11,473
T. Godwin, Hanley	11,425
J. Bagnall, Fenton	11,130
Bennett Brothers, Burslem	11,050
J. Gallimore, * Newcastle	10,994

* Accepted.

Coulston (Surrey).—For the formation of a new road at Smithbottom Lane. Messrs. Vigers & Co., surveyors, 4, Frederick's Place, Old Jewry, E.C.:—

G. S. Faulkner, Reigate	£1,413	14	6
F. Fowles, Willesden Green, N.W.	1,300	0	0
C. Castle & Co., Westgate-on-Sea	1,220	0	0
J. Jackson, Forest Gate	1,188	0	0
F. Thacker, Balham	1,167	0	0
W. Neave & Son, Kensal Rise, W.	1,154	0	0
H. Williams, Harpenden	1,150	0	0
E. Iles, Mitcham	1,087	0	0
T. Adams, Wood Green	996	0	0
J. C. Trueman, Swanley	995	0	0
S. Kavanagh & Co., Surbiton Hill	948	0	0
G. Bell, Tottenham	929	0	0
Fry Brothers, Greenwich	875	0	0
B. Yewen, * Croydon	875	0	0
T. Free & Sons, Maidenhead	860	0	0
C. W. Killingback & Co., Camden Town	857	0	0
F. White, Selhurst	831	5	4
W. Hall, West Croydon	788	14	0

* Accepted.

Croydon.—For the extension of East Croydon sorting office, for H.M. Office of Works, &c.:—

F. Graham & Co.	£3,800	0	0	£40	0	0
C. Horton	3,453	0	0	40	0	0
Smith & Sons	3,279	0	0	160	0	0
J. Shelbourne & Co.	3,241	0	0	3	0	0
T. Pearce	3,327	0	0	—	—	—
General Builders, Ltd.	3,211	0	0	25	0	0
R. B. Amos	3,200	0	0	30	0	0
Martin, Wells & Co., Ltd.	3,197	0	0	—	—	—
Myall & Upson	3,186	0	0	26	0	0
R. Dean & Co.	3,178	0	0	58	0	0
J. Smith & Sons, Ltd.	3,083	0	0	107	0	0
W. H. Wagstaff & Sons	3,051	0	0	107	0	0
Cropley Brothers, Ltd.	3,037	9	0	40	0	0
Chambers Brothers	3,012	8	4	77	8	4
E. P. Bulled & Co.	2,925	0	0	66	0	0

A.—Credit for old materials.

Hexham.—In the list of tenders for pipe sewers, &c., at Hexham, on p. xvi of our issue for last week, the tender of Messrs. E. Henderson & Son, of Ponteland, near Newcastle-on-Tyne, was given as £2,260, instead of £2,960.

London, N.W.—For the erection of buildings, &c., in connection with a housing scheme at Lower Cross Road, for the Hampstead Borough Council. Mr. O. E. Winter, A.M.I.C.E., borough engineer and surveyor:—

Mattock & Parsons, Gray's Inn Road, W.C.	£14,791	0	0
J. Guttridge, Peterborough	13,988	11	0
A. Hudson & Co., Westminster	13,905	0	0
J. Wells, Vauxhall	13,432	0	0
C. F. Kearley, Kensington	13,346	0	0
Perry & Co., Bow, E.	12,957	0	0
C. Wall, Ltd., Chelsea	12,493	0	0
Johnson & Co., Ltd., Wandsworth Common	12,490	0	0
G. Neal, Kilburn	12,490	0	0
G. E. Wallis & Sons, Ltd., Maidstone	12,473	0	0
Knight & Son, Tottenham	12,380	0	0
J. & M. Patrick, Wandsworth	12,331	0	0
B. E. Nightingale, Albert Embankment	12,166	0	0
Appleby & Sons, Lambeth	12,000	0	0
Davey & Sons, Southend-on-Sea	11,997	0	0
Lawrence & Son, Waltham Cross	11,994	0	0
E. J. Saunders, Croydon	11,978	0	0
Cowley & Drake, Willesden Green	11,859	0	0
J. Parsons, Waterloo Road, S.E.	11,847	0	0
Banyard & Son, * Gwydir Street, Cambridge	11,300	0	0

* Recommended for acceptance.

Swanage.—For the construction of a retaining wall (second section) along the shore road, for the Swanage Urban District Council:—

J. A. Bartlett, Weymouth	£2,238	0	0
F. H. Parsons & T. Clark, Swanage	2,085	0	0
J. T. Whettham, junr., Weymouth	2,067	0	0
Burt & Burt, * Swanage	1,977	4	2
F. Parsons, * Swanage	1,820	0	0

* Accepted.

† Withdrawn.

Coming Events.

November 29 to December 3.

CAMBERWELL SCHOOL OF ARTS AND CRAFTS.—Annual Exhibition of Students' Work, Peckham Road, 2 to 10 p.m.

Wednesday, November 30.

SURVEYORS' INSTITUTION.—Meeting of the Finance Committee at 4 p.m.

ARCHITECTURAL ASSOCIATION (Discussion Section).—Mr. E. A. Rickards on "Abstract Form in Architectural Design," at 7.30 p.m.

SOCIETY OF ARTS.—Mr. Arthur Lee, M.P., on "The British Canals Problem," at 8 p.m.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. Crum Watson on "An Architect's Holiday in Portugal," at 8 p.m.

Thursday, December 1.

INSTITUTION OF ELECTRICAL ENGINEERS.—Dinner at the Hotel Cecil at 7.30 p.m.

SOCIETY OF ANTIQUARIES.—Meeting at Burlington House at 8.30 p.m.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—Mr. Alexander McGibbon on "Byzantine Architecture."

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.—Mr. S. Sellon on "Running Powers."

CHEMICAL SOCIETY.—Meeting at Burlington House at 8 p.m.

Friday, December 2.

UNIVERSITY COLLEGE.—Mr. D. S. MacColl on "Wilson, Gainsborough and Other Painters," at 4.30 p.m.

SURVEYORS' INSTITUTION.—Meeting of the Election Committee at 4 p.m.

GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Mr. R. W. Horn, A.R.I.B.A., on "Tenement Planning," at 8 p.m.

INSTITUTION OF CIVIL ENGINEERS (Students' Meeting).—Mr. R. T. McCallum on "Midland Railway, West Riding Lines: The Construction of Contract No. 1," at 8 p.m.

Saturday, December 3.

INCORPORATED BRITISH INSTITUTE OF CERTIFIED CARPENTERS.—Annual Meeting at Carpenters' Hall, at 6 p.m.

Monday, December 5.

SOCIETY OF ENGINEERS.—Ordinary Meeting at 7.30 p.m.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Meeting at 8 p.m. Discussion on "Ferro-concrete."

LIVERPOOL ARCHITECTURAL SOCIETY.—Mr. Maurice B. Adams on "More about Modern Libraries."

Tuesday, December 6.

NORTHERN ARCHITECTURAL ASSOCIATION.—Rev. H. C. Windley, M.A., on "English Church Architecture in its relation to English History," at 7.30 p.m.

Wednesday, December 7.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A Practical Demonstration of Architectural Modelling, by Mr. G. Hayes.

SOCIETY OF ARTS.—Mr. W. F. Reid on "The International Exhibition at St. Louis," at 8 p.m.

ROYAL ARCHAEOLOGICAL INSTITUTE.—General Meeting, 20, Hanover Square, at 4 p.m.

Thursday, December 8.

SOCIETY OF ANTIQUARIES.—Meeting at Burlington House at 8.30 p.m.

Friday, December 9.

UNIVERSITY COLLEGE.—Mr. D. S. MacColl on "Turner," at 4.30 p.m.

PERFECTION IN Spring Hinges

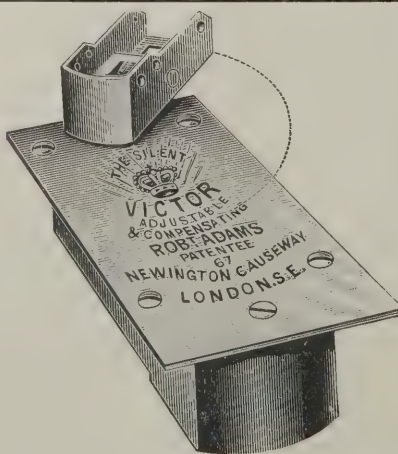
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When writing to Advertisers please mention The Builders' Journal.

Electrical Notes.

New Electricity Bills.

In the next session of Parliament the county of London will be made the fighting ground for several large schemes for the supply of electricity in bulk for lighting and power to suppliers having the necessary orders, who will then retail it to the consumers. As the schemes are put forward by companies and ask for powers in municipal areas, there is likely to be some lively opposition. The first in the field appears to be a new company entitled the Administrative County of London and District Electric Power Company, which seeks powers in the county of London as well as in several boroughs in Middlesex, Surrey, Kent and Essex. Of the existing concerns, the Metropolitan Company schedules in various metropolitan boroughs and in parts of Middlesex, Berks and Bucks; the County of London Company gives its attention to the City and adjoining boroughs, and Tottenham; whilst the Charing Cross Company seeks powers in the City, Westminster and various boroughs adjacent, also in part of Middlesex. In addition, the corporations of Ealing and Croydon seek powers to supply current to neighbouring boroughs. Many of the schemes overlap each other completely, and no doubt Parliament will have to do a considerable amount of weeding out.

An Interesting Gas Producer Plant.

The use of gas producers for isolated small light or power installations is not at all novel, but their advantages are by no means sufficiently recognized or freely enough employed. One of the latest, the special point about which is that it has been designed to work with ordinary gas coke, is being

exported to India, where it will produce gas for driving a Crossley high-speed engine at the Calcutta electric-light station. The producer was recently tested by Messrs. Crossley, the manufacturers, with coke obtained from the Manchester Corporation Gasworks. When analysed this coke was found to consist of 81.3 per cent. fixed carbon, 1.8 per cent. volatile matter, 15.6 per cent. ash and 1.3 per cent. moisture. The calorific value was 12,411 British thermal units. The plant was run six hours at full load, the electrical equipment being a dynamo by Messrs. Crompton & Co. The result showed .92 lb. fuel per brake-horsepower hour, the total fuel consumed being 488 lbs., whilst the kilowatt hours were 3,684. The manufacturers are particularly pleased with the result, which is certainly very good.

The Cost of Electrical Power.

At a lecture at Dundee recently it was shown by Mr. W. C. Martin what economies could be effected in factories by electrical driving, an application particularly suited to that town, where the manufacturers did not sufficiently avail themselves of the local supply. In large towns such as Bradford and Glasgow the cost of 1 horsepower for a working year of 2,700 hours came out to £8 8s., power being supplied at 1d. per unit. At Niagara, where of course the burning of coal was unnecessary, the cost was £4, being slightly more in towns further distant. As regards towns like Dundee, Mr. Martin showed that in rope works the cost of steam power on the same basis was £10 6s., whilst for an engineering shop it was £13 2s. and for a small plant as high as £37. The cost would be less in large mills, but there was naturally a great loss in transmission by belts and shafting. For

electric driving large economies could be made even in small works. The Americans have recently been adopting electric driving to a large extent in textile mills, and from a paper recently read by an expert in New Jersey it appears that the turbo-generator is finding great favour owing to its steady drive and the small space it occupies. The best electrical equipment is undoubtedly polyphase plant, owing to the simplicity of the motors and the fact that they run at constant speed. Up to the present electrical driving has not been largely adopted in English cotton mills, as it has not been found so successful as was anticipated, but with the more general use of the turbine engine and the greater development of polyphase plant no doubt there will be much to be done in this direction in the future.

A.M.I.E.E.

Electric Tramways along Rosebery Avenue are to be constructed by the London County Council at a cost of £22,500.

Electric Fittings.—The Edison & Swan United Electric Light Co., Ltd., of 36 and 37, Queen Street, Cheapside, E.C., have just issued a second edition of their catalogue dealing with ship, factory, colliery, street and traction fittings. It has been enlarged, and some of the prices have been altered.

The British School at Rome proposes to catalogue the ancient sculptures preserved in the Museo Capitolino, the Palazzo dei Conservatori and the Magazzino Archeologico al Celio. The school is in debt to the extent of £47, as compared with a surplus of £136 last year. Regret is expressed that owing to a better financial position the schools of Germany and America are able to do much more work than the British school.

The Edison & Swan United Electric Light Company, Limited.

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And at Birmingham, Belfast, Cardiff, Dublin, Dundee, Glasgow, Hull, Leeds, Liverpool, Manchester, Newcastle-on-Tyne, Sydney, N.S.W.

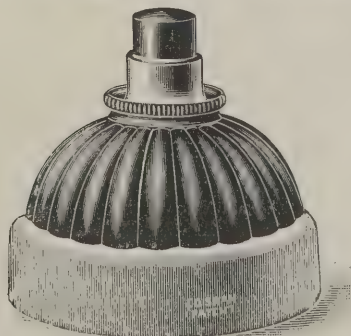
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AN ARCHITECT is willing to render assistance in his own office in the preparation of perspectives, designs, working drawings, quantities, &c.—CHAS. CARTER, M.S.A., Sherwood Lodge, Nottingham. 386

ARCHITECT and SURVEYOR'S ASSISTANT desires immediate ENGAGEMENT in a busy London office. Age 25. Working drawings, perspectives, quantities, &c. Excellent testimonials. Salary about two guineas.—P. A. D., Box 766, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

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ARCHITECT and SURVEYOR'S JUNIOR ASSISTANT desires ENGAGEMENT. Good draughtsman and colourist, quantities, measuring up old work, &c., and good general knowledge.—I., 7, Queen's Road, Twickenham. 784

ARCHITECTS and SURVEYORS undertake to assist in our own office all branches of the profession.—Box 772, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

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ARCHITECT'S ASSISTANT (20), 4 years' experience, desires ENGAGEMENT in Quantity Surveyor and Architect's office. Neat draughtsman, tracer and colourist, knowledge of quantities. Good references, moderate salary, and specimen of work.—Box 759, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S JUNIOR ASSISTANT desires ENGAGEMENT; measuring up, plotting, details from sketches, neat and accurate tracer, colourist, &c., seven years' experience.—C. J. M. M., 35, Danes Hill Road, Leicester. 775

ARCHITECT, SURVEYOR, and MINING ENGINEER'S ASSISTANT, desires ENGAGEMENT; 5½ years' experience; general practice, including mining and office routine; ex. refs., moderate salary.—C. R. Greetland, Halifax. 791

BUILDER'S CLERK and DRAUGHTSMAN, age 23, desires re-engagement; working and detail drawings, tracings and estimating, and general routine, typewriting, etc.; excellent references.—A. W., 113, Cowper Street, Hove. 768

BUILDER'S CLERK (21), six years' experience. General routine, time, materials, assisting with p.c., etc.; shorthand writer and typist. Good refs.—Box 767, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

BUILDER'S CLERK desires SITUATION. Temporary or permanent. Accustomed to booking, jobbing work, and general accounts, preparing plans, tracings, &c. Salary moderate.—N., 283, Great College Street, Camden Town. 795

BUILDER'S SON (age 20), four years in charge of office seeks CHANGE for experience in office of large firm in North or Midland counties. Dimensions, measurements, assist with quantities, book-keeping, and usual routine.—C. Wing, Bridge House, Birchington-on-Sea. 769

CLERK OF WORKS.—Architect's Assistant, 8 years' experience, desires experience as above on good building, town or country; has already been on £9,000 job in Westminster. Salary, 45s.—ARCHITECT, 410, Brixton Road, S.W. 777

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PLUMBER, registered by examination, hot water and gas, requires PIECEWORK, labour only. Highest references.—RUSSELL, 15, Birkbeck Road, Wimbledon. 782

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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, December 7th, 1904.



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TH VIEW OF CHAPEL. H. PERCY ADAMS, F.R.I.B.A., ARCHITECT.

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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, December 7th, 1904.



PALACE AT AGARTALA FOR H.H. THE MAHARAJAH OF INDEPENDENT TIPPERAH: SOUTH FRONT. EDWARD THORNTON ARCHITECT.



TEMPLE IN MEMORY OF THE LATE MAHARAJAH OF MYSORE, KHALIGHAT. EDWARD THORNTON ARCHITECT.

THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

December 7, 1904. Vol. 20, No 513.

6, Great New Street, Fetter Lane, E.C.

Summary.

The Dublin master-builders have given up their annual dinner this year and decided to apply the money towards assisting the numerous building trade workmen out of employment in the city. (Page 303.)

The tower to Rochester Cathedral, built in 1825 by a Gothic architect named Cottingham, has been replaced by one designed by Mr. C. Hodgson Fowler. (Page 308.)

To render roads dustless they can be sprinkled with some viscous mixture like Westrumite, Pynoilene and Aconia—temporary palliatives—or they can be formed with "tarmac," which consists of furnace-slag dropped into tanks of tar: the road thus formed being quite dustless. (Page 301.)

A moving pavement is proposed to be constructed in New York from east to west. (Page 308.)

The Board of Trade cannot grant the Quantity Surveyors' Association the sole right to use the letters Q.S.A. after members' names. (Page xvi.)

Sir Oliver Lodge says that an iron lightning conductor is more satisfactory than a copper one. (Page xi.)

In a lecture before the Sheffield Society of Architects and Surveyors last week, Mr. J. R. Wigfull pointed out that in the twelfth century what now was France was then divided up into separate provinces, about half of which were under the control of the King of England; so that Gothic architecture was not the invention of the French, in the modern meaning of this term. (Page 303.)

Mr. Francis W. Bedford died last week. (Page 308.)

The overhead electric cranes in the new works of Messrs. Redpath, Brown & Co. at Manchester span 100ft. and have the remarkably rapid cross-transverse speed of 400ft. per minute. (Page 302.)

A unique chapel is being built at the King's Sanatorium. It is V-shaped, the arms constituting two naves—one for women and the other for men. (Page 304.)

In India spidery bamboo scaffolding is employed and inclined ways of bamboo instead of ladders. Women do much of the labour, carrying material about in baskets on their heads. (Page 299.)

Truth in Byzantine architecture was much more evident than in Gothic and Renaissance buildings. The absence of mouldings is suggestive to present-day designers. (Page 306.)

Mr. D. J. Ross, the City engineer, has retired. (Page 308.)

An Exhibition of Cheap Cottages.

It will be recollected by our readers that Mr. J. St. Loe Strachey suggested in "The Country Gentleman" some weeks ago that an exhibition of cheap houses or methods of cheap building should be held. At the time we welcomed it as a means of bringing to public notice the various old and new materials available, as well as new methods of cheapening the cost. "The Country Gentleman" has now progressed with the idea and proposes to hold the exhibition from July 1st to September 30th next year. It was thought at first that the exhibition should be held in the neighbourhood of London, but in view of the difficulty of obtaining a suitable site and the disadvantage of having to destroy any cottages erected only for temporary purposes, it became necessary to consider an alternative plan. Eventually it was arranged with the Garden City Co. to hold the exhibition on their land at Letchworth. The Company will allot the necessary land for the purpose and will be prepared to offer reasonable terms to the builders of the cottages for the leasing of the land on which the cottages will be erected. The Company will be prepared to guarantee tenants for cottages (the plans of which have been previously approved) at rents showing a return of not less than 5 per cent. on the certified cost of erection, this cost of erection to be fixed at the opening of the exhibition. The Company may itself agree to purchase the cottages, and will have the first option of doing so at the cost of erection plus 10 per cent. for profit. It will also arrange for a public sale of the cottages at the close of the exhibition if desired. Builders of cottages may of course dispose of or rent their cottages themselves if they prefer to do so. Subscriptions are invited for the raising of funds for prizes and organization. It is hoped to make the exhibition of a national character, and examples of cottages suitable to the various localities in Great Britain will be invited. An attempt will be made to demonstrate what are the cheapest available materials in different districts. It is also hoped that exhibits will be obtained from the different Colonial Departments; also from France, Germany and other countries interested in housing. Mr. Edward Cadbury has consented to submit to the Bournville Village Trust a proposal to erect a pair of cottages according to their latest plan, and it is hoped that others who have erected model villages will take part in the exhibition. Further, manufacturers of all

classes of materials and fittings for cottages will be invited to compete. In order to get the various interested persons at work an organizing secretary and an executive committee are to be immediately appointed. Earl Grey, Governor-General of Canada, will advise the Canadian Government to exhibit a model set of farm buildings at the proposed exhibition. Subsidiary to the main exhibits of cheap cottages, it is proposed to have exhibits of photographs of cottages from all parts of the world; Garden City views; drawings and paintings of cottages from all parts of the country; photographs and drawings of examples of town development throughout the world; fittings and furniture suitable for small cottages; exhibits from guilds of handicraft throughout the country; designs for cottage gardens, garden implements, &c.; models and designs of buildings for small holdings; and, lastly, plans and reports of social, economic, co-operative, educational and other societies. The scheme is a comprehensive one and should do much to educate the public in the importance of cheap housing to our national prosperity and the means by which to build cheaply.

No. 17 Fleet Street again.

In April, 1900, the London County Council voted £27,300 for the acquisition and restoration of No. 17, Fleet Street, popularly (but inaccurately) known as the Palace of Henry VIII. and Cardinal Wolsey. Nothing in the way of restoration, however, has yet been done, and the Council are being asked when they intend to commence work on the building. It is well known that the present front is merely a shoddy casing to the real half-timber work behind, the house having been built about 1610 for Henry, Prince of Wales, as an officer of the Duchy of Cornwall. It is almost a unique specimen of the architecture of the period, and on the first floor there is a panelled room with a ceiling described as the finest remaining *in situ* in London. Having voted the money for restoring this building to its proper appearance, the Council ought to carry out the work without further delay, more especially as the ceiling appears to be in none too safe a condition. We think it right to state, however, that the delay has been very largely due to the objections raised by the Benchers of the Inner Temple in regard to setting back the gateway. These have at last been settled, and we trust the work will now proceed at once. It will be exceedingly strange to see the old front restored to Fleet Street.



MEN WHO BUILD.

No. 73.—EDWARD THORNTON, F.R.I.B.A.

SOMEHOW, Indian architecture has never appealed to the majority of English architectural students, although we have had crazes for reproductions of other climes, with what disastrous effects is far too evident in our everyday surroundings. During the past two centuries fragments of work have been introduced from Egypt, China, Japan, Ancient Greece, the Roman and Byzantine empires, to say nothing of the "cribbings" from local varieties all over Europe; it is true that on piers at fashionable sea-side places a certain mixture of Moorish and Indian detail has been given us by the designers (generally the ubiquitous engineers); but though we would avoid any such outcome of an unassimilated study of Indian architecture, we believe some attention might be paid to it with advantage.

In India the English domination, with its consequent importation of Western ideas, has necessarily entailed the erection of buildings conforming to European ideals, but it is important the designers should understand and appreciate the native style and not turn out the blatant concoction that has sufficed up to the present. That local character should be given to modern buildings erected in India needs no explanation; this requisite is so self-evident that it has been striven for by all designers of buildings in that country. It is of course difficult for a foreign architect to develop the local fitness in the design of buildings which are in the main similar to those of his native country, and in order to achieve any measure of success he must have an enthusiastic appreciation of the architecture of the country he is working in, as well as a receptive mind.

In this article we review the work of a young architect practising in India who in the short time he has been at work has

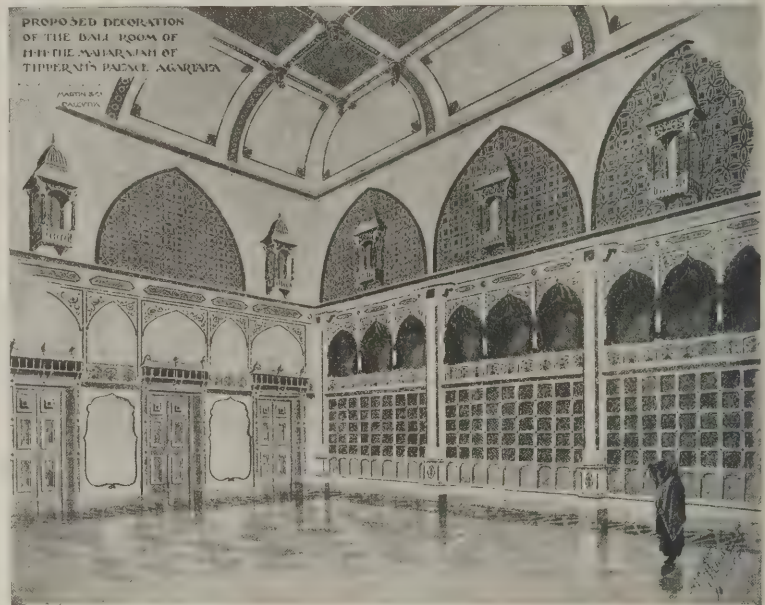
produced buildings of considerable merit, thus helping to make amends for the ill-repute of European architects in India.

Mr. Edward Thornton is the son of Sir James Havard Thornton, K.C.B., the well-known retired Deputy Surgeon-General of the Indian Medical Service, who served for 35 years in India, China, Egypt and the Soudan, and recently published his experiences in book form under the title "Memories of Seven Campaigns," profusely illustrated with drawings by his son.

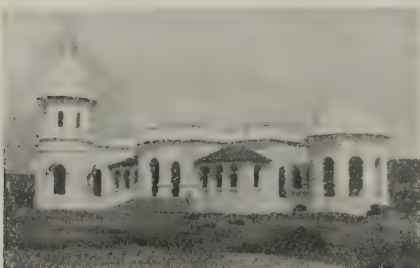
Mr. Thornton has always shown a feeling for rich detail and a love for Oriental work, and the conclusion suggests itself that this is traceable to heredity. He was articled in 1887 to Mr. Rowland Plumbe, F.R.I.B.A., for three years, visiting France and Germany in 1888 and 1889. He started in practice in 1891 at 7, Great College Street, Westminster, and, having passed the examination of the Royal Institute of British Architects, was elected an Associate of that body in 1892. From 1894 to 1897 he was associated with Mr. Arthur H. Ryan-Tenison, F.R.I.B.A., in conjunction with whom he



SAMAD OR SHRINE IN MEMORY OF A
NATIVE GENTLEMAN, AGARTALA.



GATE-HOUSE FOR MAHARAJAH OF TIPPERAH.



RESIDENCE OF MAHARAJAH, AGARTALA.

carried out additions to the National Society's Training College at Battersea and work at a large number of schools in South London. Further particulars, together with illustrations, of this period of Mr. Thornton's career are to be found in the article of this series on Mr. Tenison in our issue for June 1st last. In 1898 Mr. Thornton was appointed architect to Messrs. Martin & Co., whose partners are Sir Acquin Martin and Mr. R. N. Mookerjee, a large and well-known firm of engineers, &c., controlling five light railways—feeders to the trunk lines of India; the firm also owns a dock, the largest jute mill in Calcutta, and the Barrakur Steelworks, which is the largest—if not the only one—in India. The architectural department under Mr. Thornton's management has grown to large proportions. The firm acts as both architects and contractors, providing the design and carrying it out: and they are jealous of their reputation. It will be seen that the conditions of architectural practice in India are entirely different to those in this country, approximating more to conditions in the shipbuilding industry.

There are very few European architects in India, and they nearly all hold official positions. Where the workmen are in the employ and under the supervision of the architect the conditions are particularly favourable for good results. Such a system is perhaps as near to the ideal mediæval state as we can get. When an architect is in direct association with actual building he develops to the full, and the workmen who are retained in regular employment by him become responsive to his wishes.

It will be seen from the accompanying illustrations that Mr. Thornton has been able to achieve charming results as regards detail. His work shows a logical fitness for the locality, a mutual association of European and Eastern ideals, and an Oriental richness of detail, full of life and character and the conventionalism of the true craftsman. Mr. Thornton is accomplished in many directions, and models much of his detail himself, or shows the workmen, on the actual material, how he wishes his drawings rendered. He works in metals and is a very clever and quick draughtsman and enthusiastic sketcher (on p. 302 we give two specimens of his ability in this last respect). As a rule he



AGARTALA PALACE, TIPPERAH, IN COURSE OF CONSTRUCTION.

employs Chinamen for the carving, their wages being 6d. to 2s. a day. The native workmen have an elementary knowledge of construction, although they employ their own

traditional methods and a number of recipes, such as for making roofs water-tight, which is a difficult matter in the rainy season. Among the illustrations here given are several of work in course of construction; these show the spidery bamboo scaffolding employed, and the inclined ways of bamboo used instead of ladders. The carting is done by bullocks, and of course elephants are usefully employed. Women do much of the labour, going up the scaffold or about the job with baskets on their heads containing the materials. As regards the materials employed, native stone is used, or, where expensive to obtain, bricks are made on the site and the exterior plastered. English cement for concreting, &c., and native shell or chalk lime are used. Teak and sissoo wood is mostly used, the latter carving well.

As regards the conditions of design, the sites Mr. Thornton has had to deal with were level. Calcutta is flat and the subsoil is soft, water being found at roft. Aspect is very important; the principal rooms should all face south (from which the prevailing winds come) for the sake of coolness. In Calcutta itself this causes difficulty because ground is valuable. Since the innovation of electric fans there is not the same necessity, as formerly, of obtaining a clear blow-through in living rooms, but this is highly desirable. Every bedroom must have a combined bathroom and privy attached, and as the detritus is all removed by a manservant and emptied down the public sewers, it is necessary to have an exterior staircase leading up to them. Pitch roofs are hardly ever used. The flat roofs are constructed of concrete and are rendered waterproof by beating in



MAHARAJAH OF TIPPERAH'S PALACE, AGARTALA: VIEW FROM SOUTH-WEST SHORE OF LAKE.



WAREHOUSES AND OFFICES, STRAND ROAD, CALCUTTA.

lime for about seven days with bamboo twigs and afterwards keeping damp for several days. Heavy cornices are used for shade. Concrete is also employed by Mr. Thornton for floors.

Mr. Thornton has designed and carried out with Messrs. Martin & Co. the following works amongst others:—Palace at Agartala, for H.H. The Maharajah of Independent Tipperah; Queen Victoria Memorial Hospital at Agartala; the episcopal throne and other works to the Cathedral, Calcutta; Albert Victor Hospital, Calcutta; Residence of the Maharajah of Dighapatia, Calcutta; Deaf and Dumb Institute, Calcutta; Mysore Memorial, Khalighat; offices of Messrs. Martin & Co., the South British Insurance Co., Messrs. Strathers & Co., and another in Bow Bazaar Street—all in Calcutta; façade and alterations to the Sitianabad Mosque, Garden Reach, Calcutta; and many other buildings, including private residences, municipal buildings, mills, warehouses, &c. He won the first premium of Rs. 2,000 in the Lahore General Post Office competition; and the second premium in the Military Secretariat

competition; he also won in competition the two district offices for the Calcutta Corporation at Alipore and Cornwallis Street.

Besides India, Mr. Thornton has visited Burmah, Straits Settlements, China, Japan and America, and has made numerous sketches in all these countries. On his return to England recently he was elected a Fellow of the Royal Institute of British Architects. He is returning to Calcutta shortly. We give below a few particulars respecting the various buildings illustrated.

The several buildings at Tipperah erected from Mr. Thornton's designs include:—(1) The Palace, which is a building for purposes of State, containing a durbar hall for ceremonies, receptions of distinguished persons, &c.; throne-room, to contain the ancient throne of the Maharajahs of Tipperah; retiring and robing-rooms and picture galleries connected with the above; ballroom for State dances, nautches, &c.; library, billiard-room, the Maharajah's public and private reception rooms, secretary's rooms, &c. The whole is approached by a grand flight of steps leading to the spacious vestibule, after passing through

which one enters the octagonal domed chamber from which the different apartments are reached. Beneath are a number of rooms used as offices. (2) The Residence building, a building in which the Maharajah lives, containing reception-rooms and bedrooms. (3) The Bath-house, containing two apartments for religious bathing, a swimming bath, and a small octagonal arcaded and vaulted chamber containing a marble shower bath; this room has windows fitted with pierced stone tracery to allow a cool breeze to pass through. All these bathrooms are paved with marble in varying designs, and the swimming bath is tiled with glazed white tiles. The Bath-house is connected with the Palace by a marble paved cloister about 200ft. long. (4) At the rear of the Residence building are the Household Apartments, consisting of a number of buildings for the ladies of H.H. the Maharajah's household. (5) The Gate-house, a large gate high enough to allow an elephant with howdah to pass underneath, with quarters for a large guard of soldiers on either side. Above the gateway is the "Nobut Khena," or musicians' room, where minstrels discourse sweet music as the Maharajah or his honoured guests pass under the archway with their retinues in all the gorgeous trappings only to be found in Eastern lands. The whole of the above buildings are lit throughout by electricity, supplied from a power-house at the back of the Palace. The grounds and approach to the Palace are also



BOW BAZAAR, CALCUTTA.



RAJAH OF DIGHPATIA'S HOUSE LOWER CIRCULAR ROAD, CALCUTTA.

lit up by powerful arc lights, whilst the light in the lantern of the dome may be seen for miles. (6) The Victoria Memorial Hospital, H.H. the Maharajah's gift to the inhabitants, has now been opened for some time and is equipped with every appliance, including X-ray apparatus, and under the skilful direction of Dr. Mullick is proving most useful.

The whole of the bricks for the above buildings were made near the site, Ball's patent kilns being used for the burning. The greater part of the lime used in the superstructure was also burnt near the site, the limestone being brought from Chattak by boat. The steelwork in the ribs of dome, &c., was all prepared on the site under the superintendence of Mr. Arthur Kimber, C.E., who looked after the construction of the whole work. The building has several steel frameworks placed at different levels to tie it together, the better to resist the shocks of earthquakes which are common in this district.

The floors throughout the Palace Residence and Bath-house are of marble or tiles, with the exception of the parquet floor of the ballroom. Many of the marble floors are of



TEMPLE IN MEMORY OF LATE MAHARAJAH OF MYSORE, KHALIGHAT.

intricate patterns, and the marbles used are very finely veined and coloured. Many of the doors and windows have enriched mouldings and carved overdoors.

The memorial to the late Maharajah of Mysore at Khalighat was erected on the banks of Tolley's Nullah (supposed to be the original Ganges), on the spot where the remains of the late Maharajah were committed to the flames. The plans were prepared under the instructions of the late Sir Sheshadri Iyer Dewan, of the Mysore State. The style is Dravidian. The stone used was brought from Bombay and worked on the site. The details of the enrichments, of which a good number were from drawings of old examples supplied by Mr. Standish Lee, Superintending Sanitary Engineer to the Mysore State, were all modelled in clay before being executed. The foundations of this temple had to be built behind a cofferdam and taken down below the bottom of the Nullah. The interior doors will be of teak, inlaid with mother-of-pearl and ivory, and are being made in Mysore by local craftsmen.

The bishop's throne, Calcutta Cathedral (of which we cannot obtain a photograph worthy of reproduction), was erected in memory of Bishop Johnstone. The whole

of the woodwork was executed by Chinamen. After Mr. Thornton had carved a few crockets and stops himself, they soon grasped the character of the work and he was surprised at the go and vigour they got into it. The carving of the vine along the front of the book-rest (for which he made a very careful shaded drawing) is a remarkably good performance for a Chinaman who had never before tried his hand at Gothic carving. The marble base, which contains some interpenetrating mouldings (over which the native masons had to smoke many "hubble-bubbles"), was also very well carried out.

The joinery and carving of posts and brackets for the show-case for St. Louis Exposition (see p. 303) was done in teak by Chinamen, and the spandrels carved in sissoo wood by Punjabs.

The new mandir or church which is to be built at Bowanipore for the Brahmasamaj is interesting. The plan is in the form of two intersecting squares, a large dome being placed over the intersection

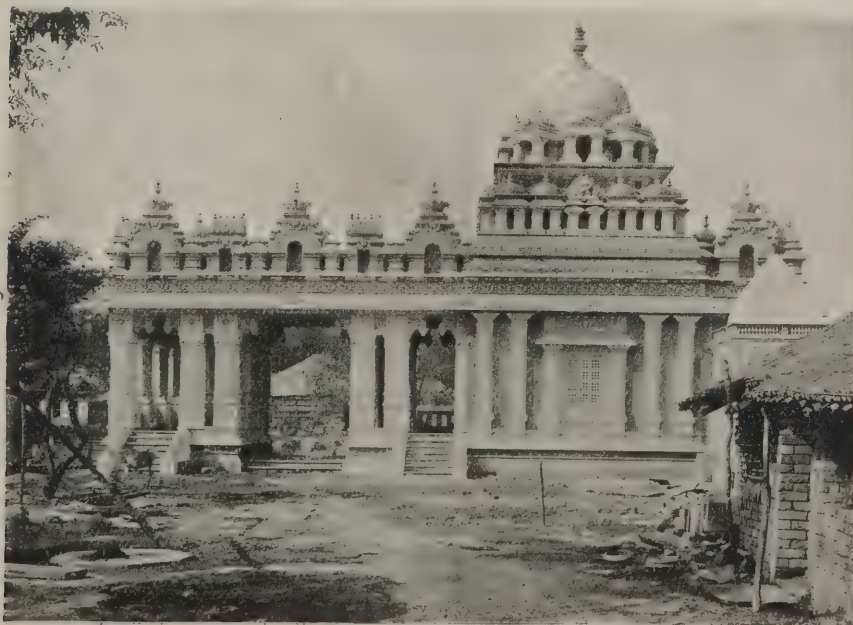
or common area and half domes at the corners. The Brahmasamaj is a religious sect that has seceded from the orthodox Buddhism and believes in a kind of combination of Buddhism and Christianity.

DUSTLESS ROADS.

IN a paper on this subject which he read before the Automobile Club last Thursday, Mr. Scott Montagu, M.P., said that treatment must be either palliative (and therefore temporary) or permanent. In the first category he classed Westrumite, Pynolene and Aconia, which consist principally of crude petroleum, to which ammonia or other soluble substance is added. These materials are all viscous, and to this property their efficiency is due, for their presence on the roadway binds the dust and makes it so heavy that it cannot rise. The objection to them is mainly their smell. Westrumite and Aconia had, however, taken a permanent place as dust layers, and in England alone the Ipswich authorities had purchased 11 tons during the past year, Doncaster 60 tons, Epsom 15, Hampstead 10, Birmingham 23, Newmarket and Ascot 25, Battersea 21, whilst many other towns had employed smaller quantities. The use of water should be con-

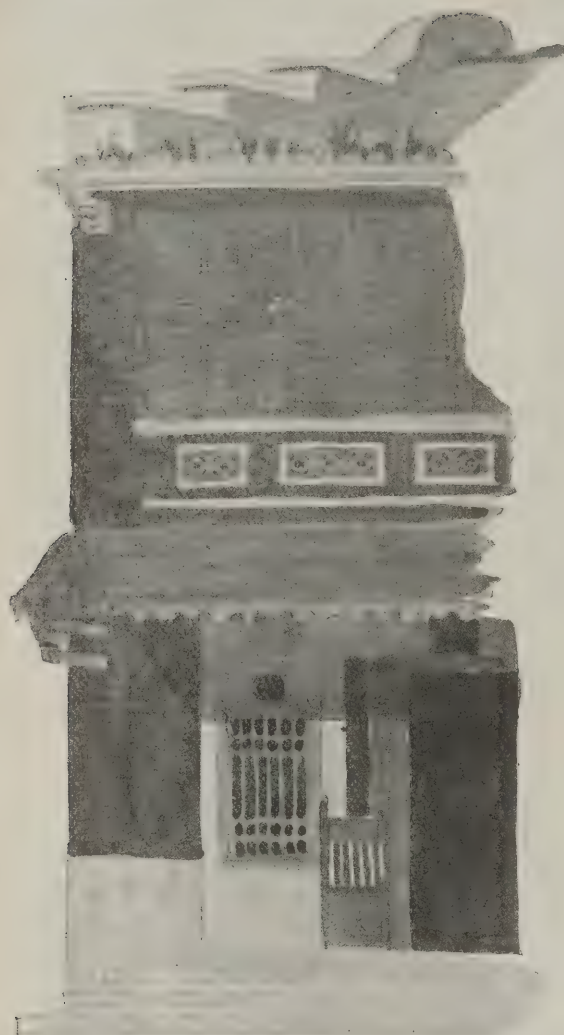


DETAIL OF TEMPLE IN MEMORY OF MAHARAJAH OF MYSORE.



TEMPLE IN MEMORY OF THE LATE MAHARAJAH OF MYSORE, KHALIGHAT.

demned, for it only washed away the binding material of the road, and in hot weather was efficient for only two hours, whilst the other palliatives mentioned were able to keep a surface free from dust for from ten to fourteen days. Among the more permanent remedies was tar. The cost of coating roads with tar worked out at between 1d. and 2d. per sq. yd.; but, once laid, it would remain effective for six months. As a "bottoming" agent tar, however, possessed a particular value, for when so used in the formation of roads the sinking of the upper metal prevented the rising of small loose grit to the surface. The most perfect road material hitherto obtained was, however, "tarmac" formed by dropping heated furnace-slag into tanks of tar. The slag, being porous, absorbed the tar, and when used for roads formed a surface absolutely waterproof, and therefore dustless. Portions of the roadway in the neighbourhood of Bath had been so treated more than twelve months ago, and as yet, whilst absolutely dustless, they showed no signs of wear. "Tarmac," however, was expensive, though only slightly more so than the best granite or quartzite; and it was, therefore, doubtful whether the district or county councils could be expected to bear the expense which its wide use would entail.



HOUSE FRONT IN CHINESE QUARTER, TSEKAI MOUNG STREET, PEGU, BURMA. DRAWN BY EDWARD THORNTON
[Materials: Red bricks, green painted woodwork, and white plaster.]

NEW BUILDINGS IN TRAFFORD PARK, MANCHESTER.

THE magnitude of the establishment of the British Westinghouse Electric Co. in Trafford Park, Manchester, is such as to somewhat dwarf the remaining building operations which have been continuously in progress since the Trafford Estate passed into the hands of a company. But though individual cases may be almost unnoticed by a casual observer, the rapid increase in the number of buildings is very striking to any one visiting the scene after a short absence. Among the latest erections, the new works and offices of Messrs. Redpath, Brown & Co. occupy a site opposite the Westinghouse, and, though of a considerable size, appear small under the shadow of that huge hive of industry. Between the Wharf Road and their famous waterway, the Ship Canal Co. are in occupation of a new block of warehouses which have been very quickly erected. The place, used to be a quagmire, being an old river bed and, having a substratum of shifting sand. There are four warehouses in the block. The wall foundations, having a total length of half a mile, were excavated to a depth of 20ft. below the surface of the ground, and a concrete wall from 3ft. to 5ft. thick was filled in to ensure the required stability. Under the weather conditions that prevailed at the beginning of the year this was no easy matter. The building is one storey high and covers an area of 14,000 sq. yds. The whole of this area had to be filled in to a depth of 10ft. to reach the required level, while above this a layer of pitching was put down and the whole made firm and compact

by the continuous use of a steam roller. The paving of flags and setts was then laid, and now presents a remarkably solid and even appearance. Where the warehouses intercommunicate for traffic a fireproof corridor with massive iron doors at each end forms an efficient screen, and a hydrant installation provides additional security. Light enters through glazing in the roof, wired glass being used, whitewashed to protect the goods underneath from the excessive heat of the sun during the summer months. Artificial light is provided by sixty arc lamps suspended from the steel purlins; each lamp has a separate substitutional resistance, so that, should one light fail, no other is thrown out of circuit. The lamps are carried on the walls outside the building, again for purposes of fire prevention. Two lines of track down the inside of each warehouse allow goods to be hauled in trucks to any position in the length of the warehouses. Locomotives are not allowed to enter, tractive force being afforded by electric capstans and fairleads placed in the 6ft. way. Goods are stored on the flagged floor and can be piled to a height of nearly 30ft. before coming foul of the overhead electric cranes. Of these latter there are two to each warehouse, the span being 100ft. and the load $1\frac{1}{2}$ tons, and they have the remarkably rapid cross-traverse speed of 400ft. per minute. The longitudinal speed is not required to be great, as the cranes are normally used for loading and unloading from trucks and waggons to positions almost oppo-



SMALL PAGODA AT MINDON. DRAWN AT SUNSET BY EDWARD THORNTON.

site. The office building at the canal end of the warehouses provides accommodation for the clerical staff. The rooms are light and lofty, illuminated by electric light, and in every way well fitted. The whole of the work has been supervised by the architects, Messrs. Charles Heathcote & Sons, of Manchester and 10, Savoy Court, London, and their own staff.



PROPOSED NEW MANDIR FOR THE BOWANIPORE BRAHMASAMAJ.
EDWARD THORNTON; F.R.I.B.A., ARCHITECT.

Views and Reviews.

Who's Who for 1905.

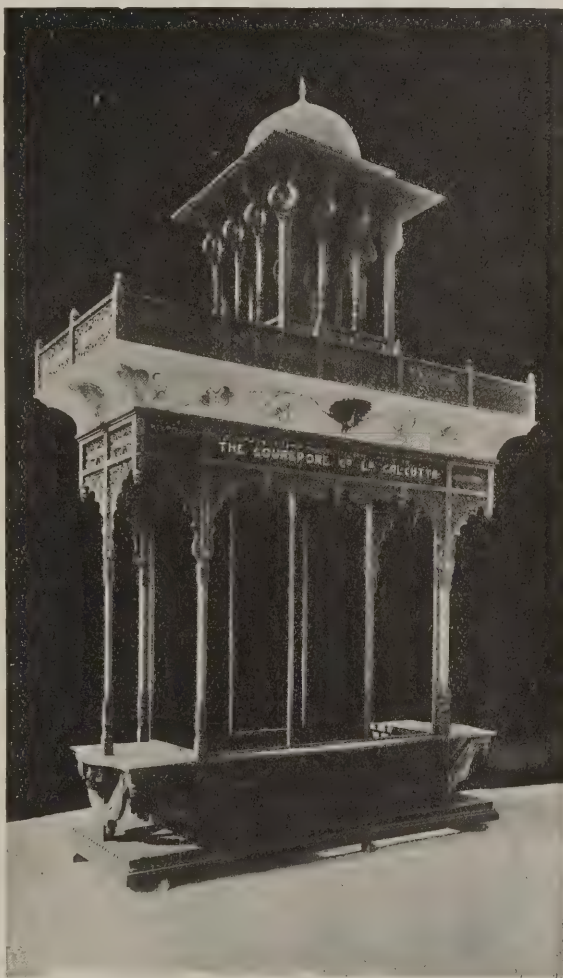
It gets bigger every year, and unless there is a decided slump or a wholesale plague among the candidates, "Who's Who" looks like becoming a very bulky volume indeed. Already the numerous tables of diplomatic, church, government, law, press, school and other representatives have had to be gathered together into an overflow book of more than a hundred pages, and there is also before us "The Englishwoman's Year-Book for 1905," another volume of information in the concise form, giving particulars of the universities and schools and of all branches of employment for women. Architects are fairly well represented in "Who's Who," all the "Sirs" being included, as well as Mr. Ernest George, Mr. Voysey, Mr. Burnet, Mr. E. T. Hall, Mr. Reginald Blomfield and Mr. T. Manly Deane among others. It is interesting to read the notes given. From these one finds that Sir Aston Webb and Sir Henry Tanner were both born in 1849, that Sir Charles Nicholson was a pupil of Sedding and Sir William Emerson a pupil of Burges; also that Mr. Burnet's recreation is the study of ancient architecture, while Mr. E. T. Hall favours singing and tennis, Mr. Reginald Blomfield hunting, shooting and cricket, Sir Aston Webb riding and sketching, and Sir William Emerson hunting, shooting and cricket. In truth a vast assemblage of facts of every prominent man's career, and, as such, a constant book of reference and a mine of interest.

"Who's Who for 1905" (7s. 6d. nett); "Who's Who Year-Book for 1905" (1s. nett); "The Englishwoman's Year-Book and Directory, 1905" (2s. 6d. nett). London: A. & C. Black, Soho Square, W.

A Popular Guide to Furniture Styles.

There is no lack of books on furniture and decoration. But most of them are large and expensive works, and more or less sectional in their aims. In attempting to present in a single small volume a comprehensive survey of all the chief furniture styles, Mr. Binstead undertook a work for which, we should suppose, there must be a very real demand. On the whole we must say that he has accomplished his task well. The book has obvious limitations, but in a cheap popular handbook these were perhaps inevitable. The book is rather descriptive than critical. It explains in a series of very readable and copiously illustrated chapters the main characteristics of the most notable furniture styles, and gives some interesting glimpses of the men who were the founders or leading exponents of these styles. In speaking of Chippendale, Mr. Binstead refers to the criticisms which have been levelled against many of the great craftsman's published designs, but he does not appear to realize how thoroughly justifiable those criticisms are. To carry out some of Chippendale's Gothic designs would have been, if not impossible, at least a useless *tour de force*, and it is probable that, as a matter of fact, many of them never were carried out. Indeed, it is likely that the desire of the engraver of the plates in "The Gentleman and Cabinetmaker's Directory" to produce

beautiful pictures was responsible for many of the details of the designs. Many readers will feel that Mr. Binstead's treatment of "l'Art Nouveau" is still more questionable. He boldly challenges the verdict of the British artists and critics who have adversely criticized the productions of this strange new style—if style it can be called. He justifies its departures from precedent and even (such, at least, would seem to be the implication) from constructional fitness. "With l'Art Nouveau," he says, "there is no correctness—beauty is its one canon, and if the creation is beautiful no one has a right to demand more of it." As to what are the beautiful manifestations of l'Art Nouveau, we are left in some doubt, for Mr. Binstead tells us that some of the illustrations to his chapter on the subject are simply for the purpose of showing "how not to do it." The reader is left to pick out for himself the admirable examples. We have not ourselves been successful in the quest. But we are inclined to forgive Mr. Binstead's critical heresies when we reach the last chapter of his book, which touches, with real insight and suggestiveness, upon what may be called the philosophy of furniture. We are shown by examples how the manners and customs, and even the temperament, of a people find expression in the decorative tendencies of the age. Altogether the book is one which,



SHOW-CASE FOR THE ST. LOUIS EXHIBITION.
EDWARD THORNTON, F.R.I.B.A., ARCHITECT.

in spite of some defects, may be heartily commended to those who require a simple, comprehensive and eminently readable introduction to the study of furniture; and we doubt not that such readers are to be counted by the thousand at the present time.

"The Furniture Styles," by Herbert E. Binstead, London: Alfred H. Botwright, 14, City Road, E.C. price 5s.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

MR. J. R. WIGFULL lectured on "The Lancelot Period of English Architecture" before last week's meeting of this Society. He urged the necessity of studying the history of a country side by side with its architecture. In illustration of this he pointed out that in the middle of the twelfth century what was now France was divided up into a number of separate provinces, about half of which were under the government or indirect control of the King of England. To say, therefore, that Gothic architecture was the invention of the French was misleading if one regarded France in its modern aspect of one country and one people. By the help of plans of various cathedrals Mr. Wigfull showed that, although starting from one point, the architects of England and France worked on more or less independent lines, and by the commencement of the thirteenth century each evolved a distinct type, as shown in the contemporary cathedrals of Amiens and Salisbury. He pointed out that the plans of our English cathedrals were largely influenced by the monastic desire for a large presbytery, while the great cathedrals of central France, intended more for general worship, were quite different in arrangement. Mr. Wigfull then dealt with the introduction of the pointed arch, showing that the difficulty of vaulting oblong and irregular spaces with the round arch led to the use of the pointed form, one which, while more readily adapted to varying spans, had the advantage of being better constructionally.

Builders' Notes.

New Slate Bed at Bethesda.—A new slate vein, which is expected to furnish material equal to that of the famous Penrhyn quarries, has been discovered in Carnedd Llewelyn, an adjoining mountain. The mountain belongs to the Crown, but a London syndicate has secured rights and is now experimenting.

The Master-Builders of Dublin have agreed that, owing to the great scarcity of employment in the building trade of the city, the annual dinner shall not be held this year, but that the money usually subscribed to the dinner fund, together with any other contributions which any member may desire to send in, shall be devoted to workmen in need of assistance.

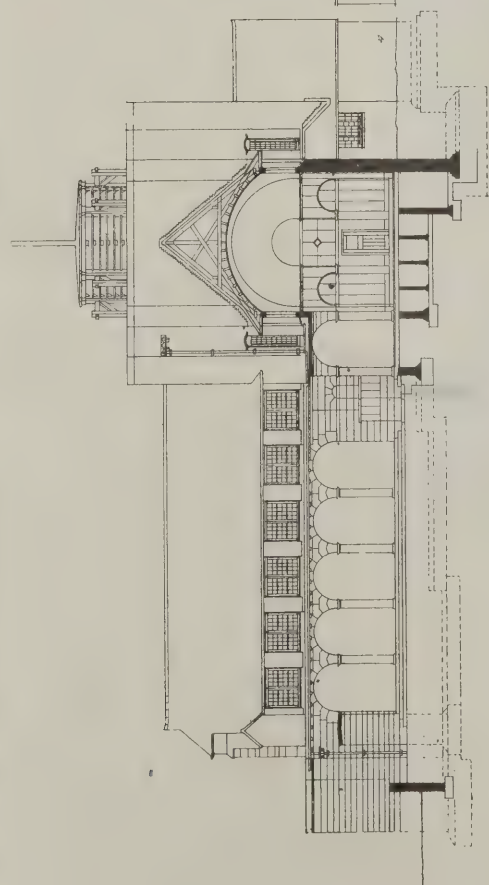
Municipal Brick-making.—The London County Council has decided to spend another £4,000 for brick-making on the Norbury Estate, Croydon. £10,500 has already been authorized for the same purpose, and between 6,000,000 and 7,000,000 bricks have been made. Owing to difficulties with the Croydon Corporation, however, building operations have not yet commenced.

For a new Congregational Church at Birkdale Messrs. Halsall, Tonge & Campbell, architects, of Southport, have been selected.

Architectural Books.—Messrs. B. & J. F. Meehan, of 32, Gay Street, Bath, send us their catalogue (No. 58) of books for sale. A number of architectural books are included in it.

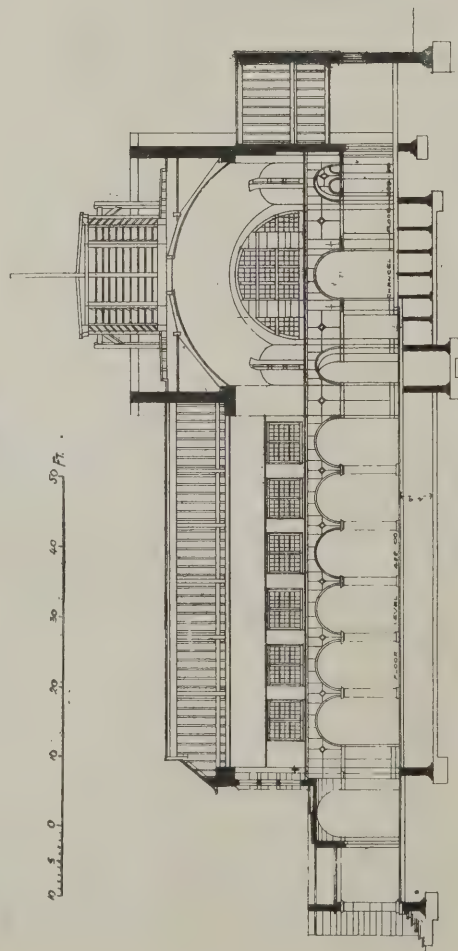
Dover Harbour Works.—The eastern and western breakwaters of the Admiralty Harbour at Dover were completed last week. The former goes seaward 3,320ft. and the latter 4,000ft. Over 32,000 blocks of 40 tons each have been set in these breakwaters. They rise 75ft. from the sea bottom and are 45ft. wide. The southern breakwater, 4,200ft. long, which is rapidly progressing, will complete this great national undertaking.

THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.

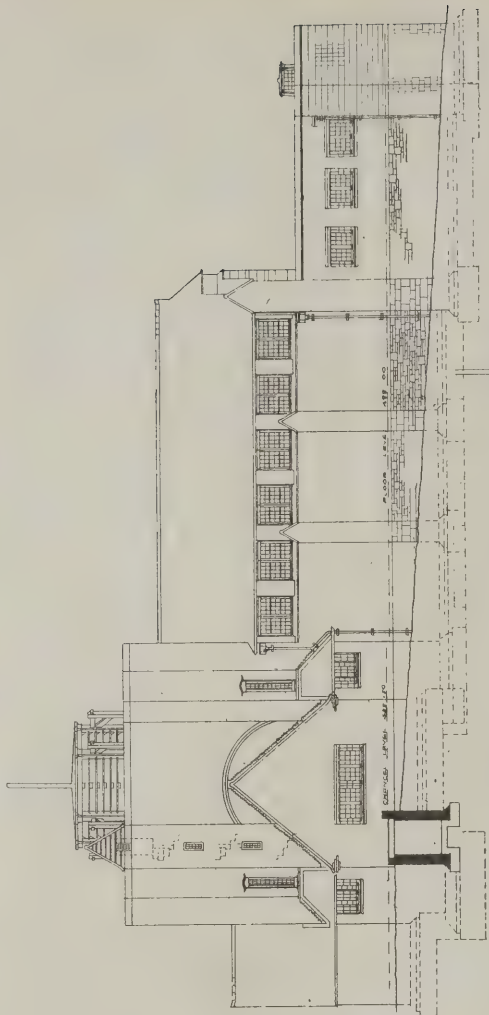


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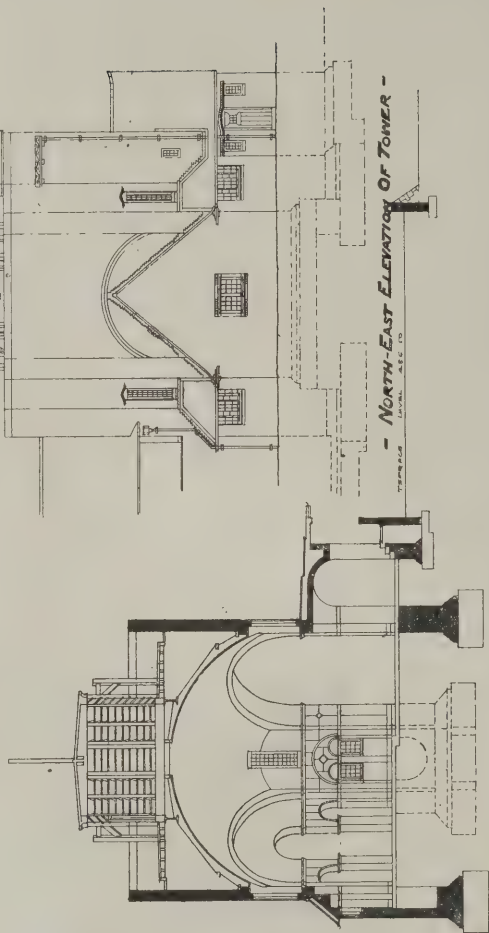
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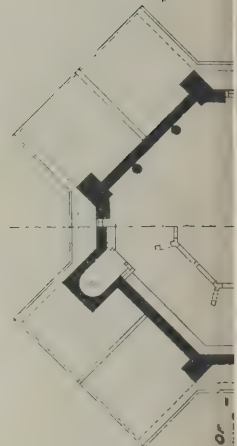
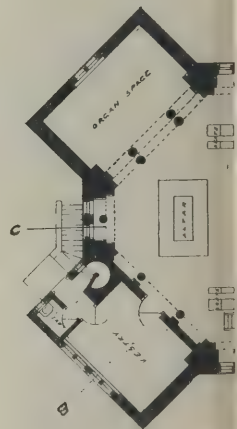
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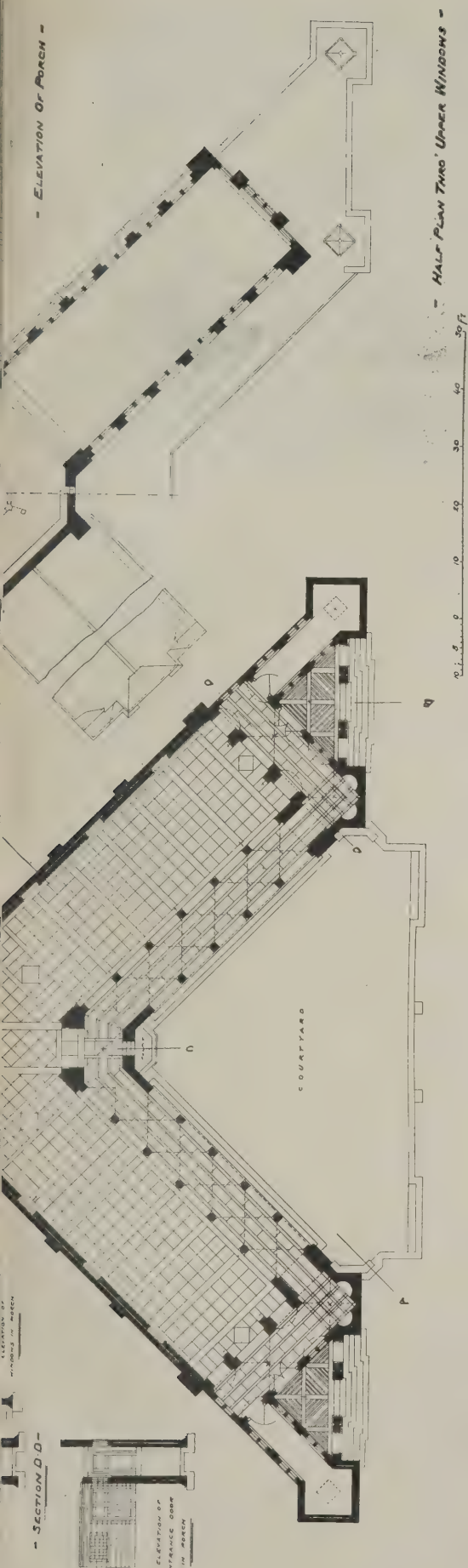
- NORTH-WEST ELEVATION -



- NORTH-EAST ELEVATION OF TOWER -

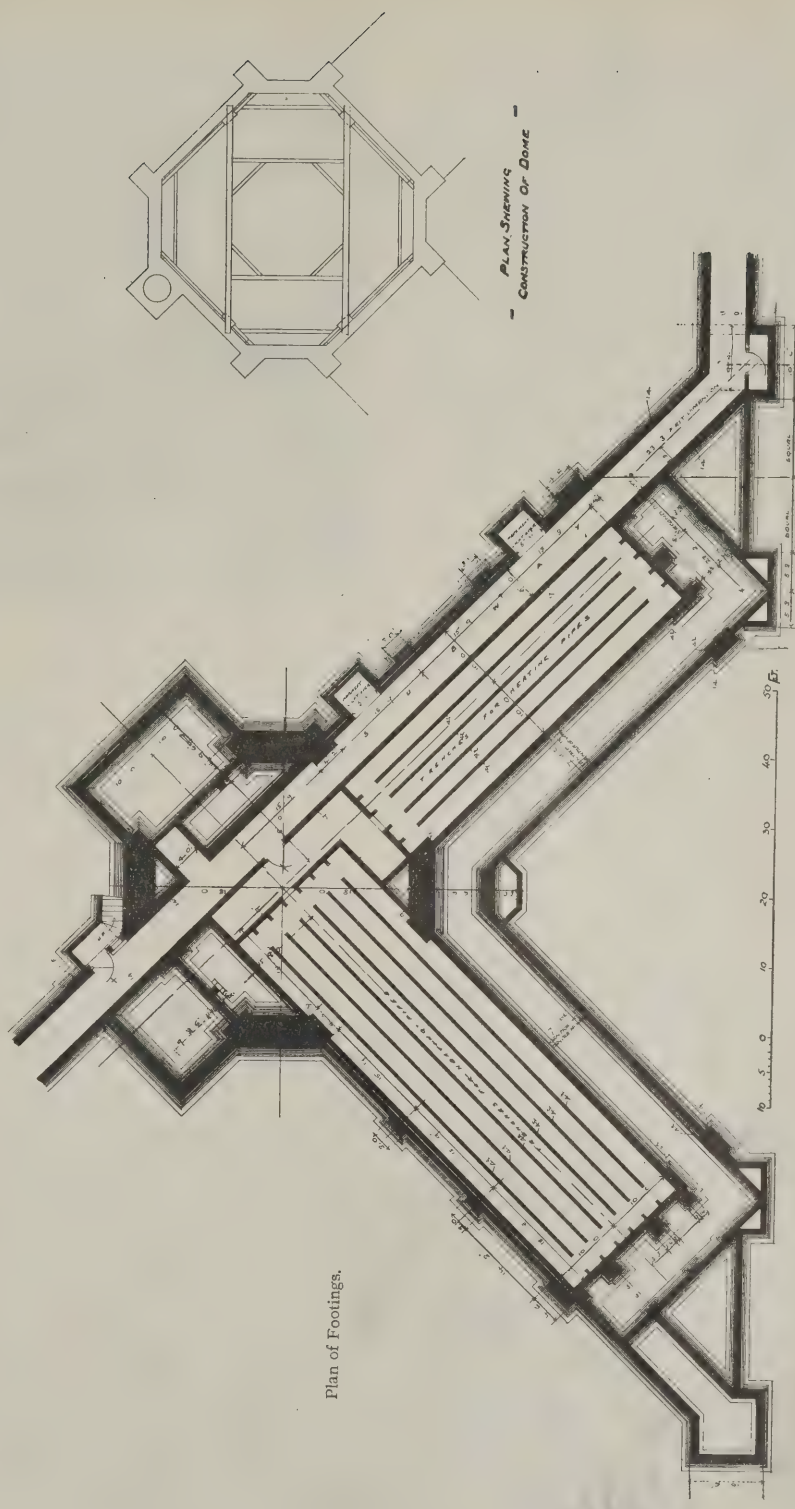


- HALF PLAN OF -



THE CHAPEL AT THE KING'S SANATORIUM.

WE illustrate this week the interesting chapel which is being erected at the King Edward VII. Sanatorium, Midhurst, Sussex, from designs by Mr. H. Percy Adams, F.R.I.B.A., of 28, Woburn Place, W.C. The exterior is of red and grey bricks arranged to give a pleasing variety of colour, with Bath stone copings, arcading and porches, and red tile roofs. Inside, the floor is of marble, the walls faced with Bath stone, and the ceilings and dome plastered. Heating is proposed to be carried out by steam pipes under the floor. The whole of the south side of the chapel is open, and so designed that the chapel, while facing due south, is protected on the west and east: the most beautiful views are obtained from the building. In fine weather it is anticipated that the service will be held out of doors, an outside pulpit being provided. The men will sit in one nave and the women in the other, and all will face the chancel. So far as our knowledge goes, the treatment of the building on these lines is entirely unique, so that we feel sure the accompanying illustrations will be examined with great interest. The cost of the chapel is being borne by Sir John Brickwood. The builders are Messrs. Longley & Co., of Crawley, who are carrying out all the other works at the sanatorium. Full particulars of the main building (which comprises an administration block on the north side connected by a corridor with the patients' block facing south) will be found in our issue for November 25th, 1903, together with plans of both blocks and a perspective of the sanatorium: and elevations of the administration building in our issue for August 24th last.



THE CHAPEL AT THE KING EDWARD VII. SANATORIUM, MIDHURST. SUSSEX. H PERCY ADAMS F.R.I.B.A., ARCHITECT.

Law Cases.

Action against an Architect for Alleged Negligence.—In the King's Bench Division last Wednesday the case of *Hodgson v. Waugh* was concluded after 'seven days' hearing. This was an action by Mr. G. H. Hodgson, a Yorkshire loom-maker, against Mr. John Waugh, a Bradford architect and civil engineer, for damages for alleged negligence and breach of duty as an architect. The defendant denied the alleged negligence and counter-claimed for fees.—The plaintiff's case was that in 1900 he was looking out for a property to buy, and he heard of Hexton Manor, in Hertfordshire. A certain amount of repair was necessary, and the plaintiff consulted the defendant about the matter, desiring to have an estimate and to have the contracts put through before starting for Japan. This, however, was found impossible, and consequently the plaintiff arranged that Mr. Charles Dean, a friend of his, should have a power of attorney to sign the contracts. That arrangement was carried out. Before he left the plaintiff was shown a summary of prices and the plans which Mr. Waugh had prepared. He approved these and sailed for Japan. The defendant's summary of prices amounted to £2,734, but the amount of the contract was £4,384 and the actual cost £6,302. The plaintiff, having regard to the fact that Mr. Dean had signed the contracts, confined his complaint to the excess of the cost over the amount of the contracts. It was said that the defendant caused certain works to be executed to the walls of the kitchen gardens contrary to the plaintiff's express instructions, that the work was very badly done, and that, though the contracts only

entitled the builder to the contract price *plus* payment on measure for extras properly ordered, Mr. Waugh disregarded the contracts and measured up the whole work. The defendant said that the estimates were only intended to show roughly the estimated cost of executing the alterations and works therein set out, and did not include such further alterations and works as might become necessary for the proper execution of the works set out in the estimates. The defendant further said that the plaintiff had

made alterations and additions to the plans which had not been provided for in the estimates, and that he (the defendant) had acted entirely in the interests of his employer, in whose absence he had to exercise his own discretion. The defendant denied the allegations in regard to the walls of the kitchen gardens, and as to the works being badly done, and generally as to the alleged negligence and breach of duty.—The Lord Chief Justice reserved judgment, intimating that he hoped to deliver it before Christmas.



THE CHAPEL AT THE KING'S SANATORIUM, MIDHURST. H. PERCY ADAMS, F.R.I.B.A., ARCHITECT.



NAVE OF CHAPEL AT THE KING'S SANATORIUM.

BYZANTINE ARCHITECTURE.

BEFORE last week's meeting of the Leeds and Yorkshire Architectural Society, Mr. Alexander McGibbon, A.R.I.B.A., of Glasgow, read a paper on "Byzantine Architecture." The subject, he said, needed no justification, considering the current popularity of the style, notably in the new Westminster Cathedral and some of the paper designs for Liverpool Cathedral; also in a large number of students' competitions, and as a suggested counter-action to "L'Art Nouveau," the vogue of which could only be explained as a protest against the restraints of orthodox architecture. Byzantine architecture was described as Romanesque modified in the principal features; it had been styled mediæval Greek. In effect the style was one of interiors principally, for as with many of the Italian Romanesque churches, the exteriors were bald, but the ideal seemed to have been marble veneer. Rustication was not employed, but the traditional Romanesque use of tiles brought about the first appearance of polychromatic architecture. The constructive methods were ingenious, but not very instructive perhaps for modern builders. An interesting point was that truth in architecture was much more in evidence then than with Gothic or Renaissance builders, for semi-circular vaults were not sheltered under a wooden roof, and there was no false dome. When height was wanted, the later usage was to elevate the dome on a drum, but still the form that was seen internally was that of the exterior. The absence of mouldings was noticeable, but suggestive to present-day designers. As to the mosaics, they were of glass rather than marble or encaustic tesserae. The carving in capitals was very characteristic, largely influenced by drill work, and the decorative effect realized in flat surface effect was more like painting or inlay than carving of the bossy sort we were accustomed to. The ornament was taken from metal-work, but the transference to another material was not allowed to influence the form.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication

Width of Light Wells.

DURHAM.—D. S. writes: "A four-storey building 50ft. high, to be occupied as business premises, is proposed to be erected on a site 35ft. wide and 200ft. deep, the two sides being entirely hemmed in by buildings so that no light can be obtained from these directions. The ground floor is to be a grocery and the three floors over to be used for different departments approached by a staircase from the ground floor. The front and back of the building will be filled with windows so as to light as much of the inside as possible, but it will be necessary to have an open well for light in the centre, and the problem is to define the area of the well required by some known rule so as to give ample light to all floors. The walls of the open well where not occupied by windows would be of white-glazed brick and would commence at first-floor level, where also a glass roof would be provided over the shop."

There is no general rule for such a case, but I should consider the minimum width for a reasonable supply of daylight as four-tenths of the height, which would give a clearance angle of about $67\frac{1}{2}$ degs. from the lowest point. This would make the width 20ft. if reckoned from the shop floor, or 14ft. 6ins. if reckoned from first floor, but in that case the shop would probably not be sufficiently lighted. It must be remembered that the internal space will be more or less obstructed by trade fixtures and the storage of goods.

HENRY ADAMS.

Exposed End of Cottage.

HAMPSHIRE.—QUERIST writes: "I possess a cottage with a timber end. The timber is covered on the inside with lath and plaster, and on the outside it is protected by another cottage, owned by B, built against it. Both cottages are very old. B is now pulling down his cottage, thereby exposing the end of mine. Can B be made to protect the end of my cottage from the weather at his own expense, or may he leave it exposed with the rain beating on to timbers and on the back side of the lath and plaster?"

I very much doubt whether B can be legally compelled to protect the exposed end of your cottage, but it is just possible that you may be able to show that in effect the division between the two houses attained the character of a party-wall. I suggest that you should draw B's attention to the fact that he is leaving your property exposed to the weather; you should accept any reasonable proposal he has to make. If he refuses to do anything, you might ask your solicitor to himself inspect the building before advising you on the matter.

F. S. I.

Estate Agents' Assistants.

SCOTLAND.—COUNTRY SUBSCRIBER writes: "What are the necessary qualifications for an estate agent's assistant, and what salary might be expected by one suitable for such a post?"

The qualifications needed by an estate agent's assistant vary considerably, inasmuch as the practice of one agent may be all town work and of another all country work, but an assistant would certainly require to be a good bookkeeper and to write a clear hand,

might be a shorthand writer and typist, and should be a fair draughtsman. His duties would—besides office work—consist of the collection of rents, the payment of rates, taxes and other outgoings, the setting-out and superintendence of repairs, timber cutting, planting, &c. They may include the management of a staff of workmen, the making of roads, construction of buildings, sanitary work or water-supply. The syllabus of the examination of the Surveyors' Institution (12, Great George Street, Westminster, S.W.) would give you a good idea of the various subjects, as it has now become practically a necessity for every surveyor to hold a diploma from that Institution. His salary would vary as considerably as his duties, ranging from the 5s. or 6s. per week for a beginner to perhaps £200 per annum for a first-class man; 30s. to 40s. per week would command any ordinary assistant. F. S. I.

Timber Loads and Qualities; Dry-rot.

TIMPERLEY.—D. B. writes: "(1) Is a carload of timber the American description of a railway wagon load, or, if not, what quantity is a carload? (2) Is timber classed as 'unassorted' of too poor a quality to be worth grading, or is it just another way of buying so that the timber is taken all as sawn, and sorted by the purchaser before he sells it? (3) Kindly state the desirable proportion of corrosive sublimate (mercuric chloride) to mix with a given quantity of water to use in a case of dry-rot."

(1) You are correct in thinking that this is an American term signifying a truck load. (2) It does not necessarily follow that unassorted timber is of poor quality, but there is a very strong probability that it would be graded did it pay to do so. (3) 1 lb. of corrosive sublimate to 15 gallons of water is the usual proportion for use in cases of dry-rot, but I have little faith in the efficacy of the solution. F. S. I.

Coastguard Stations.

GLOUCESTER.—A. J. C. writes: "What is the necessary accommodation for a coastguard station?"

We applied to the Director of Works, Admiralty, for particulars, but he replies that he cannot furnish them, and he encloses a copy reply sent to various other applicants, giving as a reason for not stating the information desired that "serious inconvenience would be caused" by doing so. The reply is marked "R.I.B.A. Final Examination." It will probably serve your purpose, however, if we give the following particulars of the new coastguard station and naval reserve battery at Sunderland:—Accommodation provided—coastguard, battery, drill shed and stores, drill-ground. Drill shed includes chief officer's office, clothing store, armoury, with carpenter's shop attached. Close by, a watchroom in communication with war signalling station; outbuildings.

Cutting Away Footings: Girder over Shop Front.

H. W. E. writes: "(1) Outside the L.C.C. area in Middlesex an addition is proposed to be made to a house which necessitates going below the foundations of the flank wall of an adjoining building. Would the party making the alterations be right in cutting away the footings and foundations of the adjoining property without underpinning same and without giving notice to the adjoining owner; or what form of notice, if any, is required? (2) What size girder should I require for carrying a fascia and zinc roof flat of a shop with 16ft. frontage and 14ft. depth, the ceiling joists running front to back?"

(1) A copy of local by-laws should first be obtained to see if any reference is made to the subject. If the footings of the adjoining owner project upon the land of the building owner, and no right has been acquired for the same, they may be cut away without

notice, but the adjoining owner is entitled to support for his foundations, and if the building owner does anything that causes damage to the adjoining building, by excavation or otherwise, he will be liable. (2) The girder for shop front would have to carry, say, 19ft. \times 7ft. \times 28 lbs. = $1\frac{2}{3}$ tons as a minimum,

2240

but as circumstances may arise causing several persons to congregate upon it, double that load might be provided for, say $3\frac{1}{3}$ tons. Assuming a $9 \times 4 \times 21$ lbs. per foot standard section, the proper factor of safety would be span ins. = $19 \times 12 = 6'12$. With a factor of 3'5 depth $3'5 \times 9$ safety of 4, the safe load on this beam would be 4'75 tons; therefore the safe load under the given conditions would be $4'75 \times \frac{4}{6'12}$ = 3'1 tons, which is sufficiently near for adoption.

HENRY ADAMS.

Safe Load on Cast-iron Column.

In the reply to this enquiry on p. 265 of THE BUILDERS' JOURNAL for November 16th the sectional area of cast-iron column was given as 6'28 sq. ins., instead of 22, which would increase the safe load to a maximum of 41'5 tons.

Exemption from R.I.B.A. Examination.

ABERDARE.—D. H. M. writes: "Am I exempted from any subjects in the preliminary R.I.B.A. examination by having passed the elementary and advanced building construction examinations?"

No, you are not exempt; but you can obtain exemption from freehand and geometry by submitting four sheets of drawings, two of freehand, one of geometrical drawing and one of perspective showing the construction lines. M.

Gas Lime for Road Metal.

KIRKCALDY.—ANXIOUS writes: "Your opinion on the following point in connection with some extensive street-making works is requested. After the (whinstone) top metal has been spread on and rolled dry, it is specified for the whole surface to be blinded with gas lime (alone) and then rolled, &c., in the usual manner. Do you consider gas lime a good material to use for a binding and blinding material? The materials obtainable in the district are gas lime, good sharp sand, road scrapings, sea gravel and whinstone chips, and engine ashes. Which of these is best, either used singly or mixed?"

It is surprising to find gas lime specified for blinding road metal. Such a material would be extremely messy in wet weather, and would give off an unpleasant smell. Of the other materials mentioned, whinstone chippings and engine ashes are the best; a mixture of these two should give a good road when consolidated, and would not "pick-up" badly. Sand and sea gravel are less suitable, the latter because it is too much rounded to bind well. Road scrapings are very undesirable, though frequently used; they are really the fine mud resulting from the "breaking-down" of the road metal—material that has obviously lost its binding properties.

Liability for New Closets and Sewers.

HOPEFUL writes: "Your opinion and advice on the following will be esteemed:—A has property in an urban district. About sixteen years ago privies and ash-pits were pulled down and rebuilt to orders of the council's predecessors in office, and a sewer was also taken out from across two houses, the fall reversed from others, and a new sewer put down—all at A's expense. The council has served notice under provisions of the Public Health Act, 1875, and Local Government Act, 1894, for the privies to be pulled down and w.c.s. to be built

(together with an extra number to give one w.c. to every two houses), and to re-sewer under houses up to closets for increased fall. The character of the district remains unchanged. The council declines all responsibility. Can A be legally compelled to do the work again at his own cost?

The weakness of A's case lies in the fact that the present privy accommodation is clearly inadequate; even with the extra number of closets required by the authority, there will be only one w.c. to every two houses. This gives the authority an opportunity to demand the provision of adequate accommodation, and it has also the discretionary power as to the accommodation to be provided. Under sections 35 and 36, Public Health Act, 1875, the authority can compel A to put in water-closets (*Nicholl v. Epping U.D.C.*, Chancery Div., before Mr. Justice Stirling, April 28th, 1899). No court of law has power to override the discretion of the authority as to the class of accommodation to be provided. A can only appeal to the Local Government Board on the two points: first, that the privy accommodation is adequate; secondly, that the provision of water-closets is not required. There is no power whereby a local authority can insist upon a change of system of drainage so long as the existing drains are sufficient for the purpose. This rests on a question of fact. If the authority, however, succeeds in its requirement as to water-closets, would the existing drains be then adequate? The last paragraph would seem to indicate that you believe the main drain is a sewer, as more than one house delivers into it, in which case it would be repairable by the authority. But it may be only a combined drain.

Gauge for Sheet Lead.

Referring to the enquiry and reply under this head on p. 295 of our issue for Nov. 23rd, Mr. James B. Harris, of Newcastle-on-Tyne, writes stating that he has had such a gauge for some years and has found it very useful; it shows from 1 lb. to 12 lbs. by $\frac{1}{2}$ lbs., and is marked "Imperial Lead. H. Osborn. Southampton." Mr. A. R. Myers, of H.M. Office of Works, Edinburgh, writes stating that a pocket gauge for sheet lead, zinc, glass and wire is made by Messrs. Stanley, of Great Turnstile, Holborn, price 5s.

Building Assessments.

DONCASTER.—RATES writes: "I send drawings (not reproduced) of a free library, with caretaker's dwelling attached. I am informed that the whole building would be assessed for rates as a dwelling-house costing £1,500. I maintain that there is no direct connection between the two buildings, and that such an assessment would be illegal. What is your opinion?"

In my opinion the whole building is ratable as a dwelling-house.

W. J. JENNINGS.

Sorel Cement.

Referring to the enquiry about this cement on p. 280 of our issue for Nov. 23rd, Mr. Robert Walker, of the Rock Manufacturing Co., Grays, Essex, writes: "You will find this material referred to under Sorel Stone in Rivington's 'Building Construction,' vol. iii., 2nd edition. It is used for a number of specialities in the building and engineering trades, though it is not politic for us to specify them, as they are regarded more or less as secret processes by the users. The price is from £7 to £8 per ton. We supply canisters under 6 lbs. gross for experimental purposes through parcels post at 2s. each, postage included, should any of your readers wish to experiment. The advantages of the cement are extreme strength and early maturity—in four to five days.

Keystones.

New County Council Offices at Falkirk are being erected at a cost of £6,000. Messrs. A. & W. Black are the architects.

The Sydenham Technical Institute, which is being erected for the London County Council from plans by Mr. W. Flockhart, F.R.I.B.A., will be completed soon.

Competition for Carnegie Free Library at Thorne, Yorks.—The designs submitted by Mr. E. H. Ballan, M.S.A., of 19 and 20, Baxter Gate, Doncaster, have been accepted by the commissioners.

Sir William Grantham will himself defend in the case brought against him by the Chailey Rural Council for building cottages at Barcombe without the plans being passed. The hearing is set down for Lewes Petty Sessions.

At the C.O., Officers' Quarters and Messes, Tidworth Camp, the halls, lobbies, corridors, bathrooms, &c., are being laid with marble "Arrolithic" terrazzo, for H.M. War Office, by Messrs. Arrolithic, Ltd., 18, Berners Street, Oxford Street, W.

Last of Old Leeds Cathedral.—The demolition of the old cathedral of St. Anne, Leeds, has at length been completed, and only a bright-hued hoarding and a few stray rubbish-heaps remain. The question is now being discussed as to what the Corporation will do with the site, which cost them £70,000. It is suggested they should give it to the city by constructing a square from the top of Park Row to the new cathedral.

A Bronze-Gilt Statue at the Savoy Hotel has just been erected over the entrance to the covered court on the Strand front. It is over 9ft. high and represents the Earl of Richmond and Duke of Savoy, who, in the reign of Henry III., built the Savoy Palace on part of the site now occupied by the hotel. He is portrayed in chain mail and cloak, with shield and lance. Mr. F. Lynn Jenkins designed and executed the statue.

New Infants' Schools in connection with Christ Church National Schools, North Brixton, S.W., have been erected from designs by and under the superintendence of Mr. William M. Weir, architect and surveyor, of 17, Victoria Street, Westminster. Classroom accommodation is provided for 150 senior infants and 50 junior infants, with marching hall attached. Messrs. W. Johnson & Co., of Wandsworth Common, S.W., were the builders.

The Demolition of Georgian Houses in Westminster.—A memorial is about to be presented to the Ecclesiastical Commissioners and to the London County Council protesting against the proposed destruction of the many old houses at the back of Westminster Abbey, notably in Great College Street, Barton Street, Cowley Street and North Street, as well, perhaps, as St. Dunstan's Wall up to the old water-gate at the south-east corner of Dean's Yard. The houses in question are of the Georgian period, and are of much architectural interest and merit. The Ecclesiastical Commissioners, who are the ground landlords, have already sanctioned the demolition of a large portion of Great College Street and the erection of new buildings there. The memorial has been signed, amongst others, by the Archdeacon, canons and clergy of Westminster, Mr. Alfred Lyttelton (Colonial Secretary), Mr. W. Burdett-Coutts, Mr. Gladstone and other members of Parliament, Lord Frederic Hamilton, Lord Doneraile, Sir Rennell and Lady Rodd, Sir E. Maunde Thompson, Sir E. J. Poynter, Lord Windsor and Sir Alfred Lyall, and is supported by the leading architectural and archaeological societies of Great Britain.

Molesey Lock is to be reconstructed. The cost of a new lock 267ft. long and 30ft. wide is estimated at £10,750, and £2,260 for the temporary lock which it will be necessary to make between the weir and the rollers.

Tagg's Island, Hampton Court, was sold by public auction last week for £600 to a syndicate renting the Island Hotel. The unexpired lease is for about six years. The Hampton Court Club and boathouses were bought in at £4,900.

Moving Pavement for New York.—The Rapid Transit Commission in New York has pronounced favourably on the proposed moving pavement to be constructed underground so as to connect the east and west sides of the city. There would be two platforms, one moving at the rate of nine miles an hour and the other at four.

Competition for new Ward at Hunstanton Convalescent Home.—The design of Messrs MacAlister & Tench, architects, of Cambridge, has been placed first by the assessor (Mr. A. Saxon Snell) and accepted by the building committee, provided it can be executed at a total cost of £4,270. Tenders will be advertised in January.

Retirement of the City Engineer.—Mr. D. J. Ross, the City engineer, has resigned his position owing to ill-health, and retires on a pension of £550 per annum. Mr. Ross entered the service of the Corporation of the City more than thirty years ago, and during that period has been associated with all the most important street improvements in the City, including the construction of the Holborn Viaduct.

The Tower of Rochester Cathedral has been rebuilt at a cost of £5,000. The old square tower was erected in 1825 by a Gothic architect named Lewis Cottingham, and was of Bath stone; it was in a very bad state of repair. The new tower is of Weldon stone, and reproduces the original one built about 1319 by Bishop Hamo. It has a spire of milled lead, and four clock-faces plentifully picked out in gold, for which, however, the architect (Mr. C. Hodgson Fowler) is not responsible. The peal of bells has been increased from 6 to 8, four of the old bells having been recast and two new ones added.

Obituary.

Mr. J. Cumberland, surveyor and auctioneer, of Luton, died recently, aged 82.

Mr. Edwin Hobbs, head of the firm of Earp, Hobbs & Miller, architectural sculptors, London and Manchester, died recently.

Mr. C. J. Ferguson, A.R.I.B.A., F.S.A., died on December 1st. For thirty years he had been architect and surveyor to the Duke of Devonshire at Carlisle, and was for some time one of the Carlisle diocesan surveyors. His important work included the restoration of Bamborough Castle for Lord Armstrong, and alterations and additions to Naworth Castle and Muncaster Castle and the college at Aberystwyth. He built and restored a number of churches. At Carlisle he will be remembered in connection with the free library and museum.

Mr. Francis W. Bedford, F.R.I.B.A., of the well-known firm of Bedford & Kitson, Leeds, died of typhoid fever at Leatherhead last Friday. He was elected an Associate of the Royal Institute of British Architects in 1891 and a Fellow in 1899. He won the Ashpitel prize in 1890 and the Owen Jones studentship in 1891-2. He was associated with Mr. Kitson in a large number of houses in the neighbourhood of Leeds and elsewhere, many of which have been illustrated in these pages, including "Lincombe," Headingley; "Hillside," Gledhow; "Weetwood Croft"; "Oak Lea"; and "Braham," Perth.

R.I.B.A.

A BUSINESS and general meeting of the Royal Institute of British Architects was held on Monday evening last, Mr. T. E. Colclutt, vice-president, occupying the chair. The following were elected members of the Institute:—As *Fellows*: W. A. Aickman, S. N. Chandabhoj, J. B. Chubb, B. J. Dicksee, W. Dunn, F. Emley, A. C. Forrester, A. L. Guy, W. Leck, E. C. P. Monson, H. A. Pelly, E. Thornton, W. F. Young and R. Watson. As *Associates*: R. J. Allison, E. G. Allen, W. H. Bagot, W. J. Ball, E. Bates, C. Batley, W. E. A. Brown, A. N. Campbell, W. A. T. Carter, C. M. Childs, B. C. Chilwell, C. B. Cleveland, N. Culley, S. C. Curtis, W. T. Curtis, W. J. Davies, A. H. Gloyne, H. P. Gordon, P. W. Hawkins, B. B. Hooper, V. Hooper, P. C. Pilling, K. D. S. Robinson, G. A. Ross, T. T. Sawday, A. Scott, junr., N. O. Searle, R. E. Stewardson, F. E. Stratton, P. J. Westwood, G. H. Widdows, F. Wilson. As *Honorary Associate*: George Noble, Count Plunkett, B.L., F.S.A.

On the motion of the chairman it was agreed to allow the Registration Committee appointed by the General Body to co-opt additional members:

Mr. G. A. T. Middleton's motion "that it be referred to the Council to consider the advisability of appointing an official assessor of architectural competitions" was accepted by the Council.

The adjourned discussion on papers on reinforced concrete read by Messrs. W. Dunn and L. G. Mouchel at the last meeting, and reported in our issue for November 23rd, then took place.

Mr. De Vesian first read a letter from Mr. Mouchel and showed additional lantern slides illustrating examples of the Hennebique system. Mr. C. F. Marsh, A.M.I.C.E., stated that cement was seldom manufactured free from pure lime, and referred to a new system adopted at some works of slaking the free lime by a jet of steam in the rotary kilns. He said it was thought that the Hennebique system was the first introduced in the country, though he was not sure that the Expanded Metal system was not the first. The stirrups were especially useful in tying together the layers in which the concrete had to be constructed. He considered the hooped column was the most efficient form. He enlarged upon the necessity of taking into consideration in any formula the relation of the elasticity of the two materials, steel and concrete. Many constructors used formulæ based on elasticities; the American systems generally. He agreed with Mr. Mouchel as regards the way in which by-laws hampered work in reinforced concrete, though he did not agree that there should be no by-laws for the material.

Mr. Harold Anderson next spoke, and then Mr. H. K. G. Bamber referred to the great advantage of having a standard specification for cement, and he stated that the Engineering Standards Committee had drawn one up which would be published shortly. The finer grinding which had been brought in of recent years made cement quicker-setting, and methods had been adopted to regulate the setting time, such as by introducing gypsum to retard the setting, but this was better done by steam introduced as referred to by Mr. Marsh.

Mr. Hannan, of Messrs. Cubitt & Co., the contractors, said they had noticed that, due to better cement, concrete did not swell as it used to, but contracted slightly, and that the fine grinding caused the cement to deteriorate if unused for a time.

Mr. A. T. Walmisley advocated Expanded Metal, by reason of its simplicity and consequent saving in supervision.

NEW LONDON BUILDINGS.

THE London County Council last week consented to the following applications under the London Building Act, 1894:—

A one-storey shop upon part of the forecourt of No. 15, Highgate Hill, Islington, submitted by Mr. H. Williams.

Buildings upon part of the forecourts of Nos. 11 and 13, Highgate Hill, Islington, submitted by Mr. C. W. Callcott on behalf of Mr. J. W. Galton.

A porch in front of the University College Hospital, Gower Street, submitted by Mr. Paul Waterhouse.

Bay windows at the "Lord Nelson" beerhouse, Masbro' Road, Hammersmith, submitted by Messrs. N. Farr and A. E. Kates on behalf of the Royal Brewery, Brentford, Ltd.

A projecting hood over the doorway of a building upon a site abutting upon the western side of Sloane Street and northern side of Basil Street, Chelsea, submitted by Mr. F. S. Chesterton on behalf of Mr. G. A. Cobb.

A porch in front of a detached house on the southern side of Court Lane, East Dulwich, submitted by Mr. H. J. Welch on behalf of Mr. R. G. Ash.

Porches, with balconies over, to Nos. 42, 44, 46 and 48, Stevenage Road, Fulham, submitted by Mr. W. Hawkins.

Projecting staircases and an oriel window at men's lodging-house, Drury Lane, Holborn, on application of Mr. R. Robertson.

A parish hall on the south side of Great Church Lane, Hammersmith, submitted by Mr. W. D. Caroe on behalf of Rev. J. Parry.

Hampstead Hospital, Haverstock Hill, submitted by Messrs. Young & Hall.

A billiard-room on the western side of Cranmer Court, Clapham Road, adjoining the Clapham Assembly Rooms, submitted by Mr. A. B. Hudson.

A one-storey cartshed at the rear of No. 39, St. Augustine's Road, St. Pancras, submitted by Mr. E. H. Abbott.

A one-storey building at the rear of No. 5, North Villas, Camden Square, St. Pancras, submitted by Mr. W. E. Sanders on behalf of Mr. A. H. Rosevear.

The Cranston "Ivanhoe" Hotel on a site abutting upon Great Russell Street, Bloomsbury Street, Streat-ham Street and Dyott Street, Holborn, submitted by Mr. T. D. Rhind on behalf of the Cranston London Waverley Hotels Co. Ltd.

An addition to the existing building on the space between No. 10, Brewer Street and Nos. 35 and 36, Bridle Lane, St. James's, Westminster, submitted by Messrs. H. & H. A. Furber on behalf of the executors of W. H. Corfield and H. M. Pike.

Eleven dwelling-houses on low-lying land abutting on Clarendon Street, Camberwell, submitted by Messrs. E. I'Anson & Son on behalf of Mr. P. Blakeway.

At yesterday's meeting the Fire Brigade Committee recommended the erection of a fire station in Greycoat Place, Westminster, at a cost of £14,360, the work to be executed by the Works Department without the intervention of a contractor, while the Theatres and Music Halls Committee recommended that consent be granted to—(1) modify the seating arrangements of the pit and stall at the Camberwell Palace of Varieties, Denmark Hill, submitted by Mr. L. Sharp; (2) alter the ventilation arrangements at the Haymarket Theatre, submitted by Mr. C. S. Peach; (3) one fireproof curtain instead of two at the new theatre to be erected at the junction of East India Dock Road and Stainsby Road, Poplar, submitted by Messrs. Owen & Ward; (4) improve the means of exit from the gallery at the Variety Theatre, Hoxton, submitted by Messrs. Wylson & Long.

The London Building Act Committee recommended that the following applications be consented to:—

An iron and glass shelter at the Bedford Palace of Varieties, High Street, Camden Town, submitted by Mr. B. Crewe.

An iron and glass shelter at the entrance to Bechstein Hall, Wigmore Street, St. Marylebone, submitted by Mr. Walter Cave on behalf of Mr. E. Bechstein.

Additions to a building at No. 17, Sutton Place, Hackney, submitted by Mr. J. Hamilt n on behalf of Mr. T. C. Wootton and Messrs. Barlow & Son.

A building upon the site of Nos. 225 and 227, Hackney Road, Haggerston, submitted by Mr. G. H. Lovegrove.

Bay-windows and a porch to No. 52, Priory Road, South Lambeth, submitted by Mr. F. H. Hingston.

Six houses on a site abutting upon the southern side of Park Road and western side of Clive Road, Norwood, submitted by Mr. P. Stock on behalf of Mr. G. R. Freeman.

A projecting porch at No. 6, Upper Brook Street, Grosvenor Square, St. George, Hanover Square, submitted by Mr. R. Armstrong on behalf of Mrs. Seymour.

A pumping-station on a site abutting upon the east side of York Road and the north side of Creek Street, Battersea, submitted by Mr. Maurice Fitzmaurice.

Buildings upon a site abutting upon the eastern side of High Street and southern side of Ammiel Terrace, Bromley, submitted by Mr. H. Heckford on behalf of the Poplar Borough Council.

School buildings on the eastern side of Kelvin Grove, Sydenham Hill Road, Lewisham, submitted by Mr. T. J. Bailey on behalf of the Education Committee of the Council.

A building on the south side of Duncon Road, Forest Hill, submitted by Mr. H. L. Upham on behalf of Mr. C. Walker.

A building upon the site of Nos. 36 and 36A, St. James's Street and No. 64, Jermyn Street, St. James's, Westminster, submitted by Mr. W. Woodward on behalf of Mr. L. Thomas.

Current Market Prices

OILS AND PAINTS.

Castor Oil, French	per cwt.	1 0 5	—
Colza Oil, English	do.	1 1 6	—
Copperas	per ton	2 0 0	—
Lard Oil	per cwt.	2 15 0	2 17 0
Lead, white, ground, car-			
bonate	per ton	16 0 0	—
Do. red	do.	15 0 0	—
Linseed Oil, barrels	per cwt.	0 16 0	—
Petroleum, American	per gal.	0 0 5 1/2	—
Do. Russian	do.	0 0 4 1/2	—
Pitch	per barrel	0 8 0	—
Shellac, orange	per cwt.	10 7 0	—
Soda, crystals	per ton	3 2 6	3 5 0
Tallow, Town	per cwt.	1 5 0	1 5 6
Tar, Stockholm	per barrel	1 3 6	—
Turpentine	per cwt.	1 17 0	—

METALS.

Copper, sheet, strong	per ton	81 0 0	—
Iron, Staffs., bar	do.	5 17 6	8 0 0
Do. Galvanized Corru-			
gated sheet	do.	10 10 0	—
Lead, pig, Soft Foreign	per ton	12 17 6	10 15 0
Do. do. English common			
brands	do.	13 2 6	13 5 0
Do. sheet English, 3lb.			
per sq. ft. and upwards	do.	14 0 0	—
Do. pipe	do.	15 0 0	—
Nails, cut clasp, 3in. to 6in.	do.	9 5 0	—
Do. floor brads	do.	9 0 0	—
Steel, Staffs., Girders and			
Angles	do.	5 10 0	6 0 0
Do. do. Mild bars	do.	6 0 0	6 5 0
Tin, Foreign	do.	133 15 0	134 5 0
Do. English ingots	do.	135 0 0	137 0 0
Zinc, sheets, Silesian	do.	28 0 0	—
Do. do. Vienne Montaigne	do.	28 12 6	—
Do. Spelter	do.	24 15 0	25 5 0

TIMBER.

Soft Woods.

Whitewood, American,			
logs	per ft. cu.	0 1 3	0 1 6
Do. do. planks and			
boards	do.	0 1 3	0 1 6
Fir, Dantzic and Memel	per load	2 7 6	4 15 0
Pine, Quebec, Yellow	do.	4 0 0	7 0 0
Do. Pitch, American	do.	2 10 0	6 0 0
Laths, log, Dantzic	per cu. fath.	4 0 0	6 0 0
Deals, Archangel, White,			
1st, 3x11	per std.	13 5 0	—
Do. do. do. 3x9	do.	11 0 0	—
Do. do. do. 2nd,			
3x14 & 15	do.	8 5 0	—
Do. do. do. 3x13	do.	8 10 0	—
Do. do. do. 3x12	do.	8 10 0	—
Do. do. do. 3x11	do.	9 5 0	—
Do. do. do. 3x9	do.	9 0 0	—
Do. do. Yellow, 3rd,			
3x11	do.	8 15 0	—
Do. Umba, Yellow,			
2nd, 3x11	do.	16 10 0	—
Do. do. do. 3x9	do.	14 15 0	—
Do. do. do. 3rd, 3x9	do.	11 15 0	—
Do. Petschora, Yellow,			
4th, 3x11	do.	7 0 0	—
Do. do. White, 1st,			
3x9	do.	10 5 0	—
Do. Räfsö, Yellow, 2nd,			
3x9	do.	12 10 0	—
Do. do. do. 3x8	do.	9 5 0	—
Do. do. do. 3x7	do.	9 0 0	9 5 0
Do. Sandarne, Yellow,			
4th, 3x9	do.	10 10 0	—
Do. Källskär, Yellow,			
4th, 3x9	do.	10 0 0	—
Do. do. do. 2 1/2x7	do.	9 5 0	—
Do. do. do. 5th, 3x9	do.	8 15 0	—
Do. Swartwik, Yellow,			
3x9	do.	7 0 0	—
Do. Skutskar, Yellow,			
5th, 3x7	do.	8 10 0	—
Do. St. Petersburg,			
Yellow, Unsorted,			
2 1/2x8	do.	8 0 0	—
Do. Bure & Nordmal-			
ing Yellow, 1st,			
2 1/2x7	do.	9 15 0	—
Do. Gulfport, Pitch			
Pine, 4x12	do.	11 0 0	—
Do. Attu Cabo, Yellow,			
Unsorted, 3x9	do.	8 15 0	—
Do. do. do. 2 1/2x7	do.	8 0 0	—
Do. do. do. White,			
5th, 3x9	do.	7 15 0	—
Do. Quebec, Spruce,			
3rd, 3x9	do.	9 0 0	—
Do. do. do. 5th, 3x11	do.	7 0 0	—
Do. do. do. 3x9	do.	7 5 0	—
Do. do. Yellow Pine,			
1st, 3x11	do.	22 15 0	—
Do. do. do.			
3x11x12ft. & 13ft.	do.	9 5 0	—
Do. do. Red Pine,			
Unsorted, 3x8	do.	7 5 0	—
Do. do. do. 3x7	do.	7 0 0	—
Do. Montreal, Yellow			
Pine, 4th, 3x11x14ft.	do.	9 15 0	—
to 16ft.			
Do. West Bay (N.S.),			
1st, 2nd & 3rd, Un-			
sorted Spruce, do.	do.	6 5 0	—

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Dec. 8	Wakefield—Porter's Lodge	Guardians	J. Day, 89 Kirkgate, Wakefield.
8	Woking—Public Offices	Urban District Council	G. J. Wooldridge, Bank Chambers, Woking.
8	London, E.—Enlargement of Post Office	Commissioners	J. Wager, H.M. Office of Works, Storey's Gate, S.W.
8	Dorchester—Alterations to Premises	Mr. W. H. C. Thurman	F. Malthy, South Street, Dorchester.
8	Gilfach, Pengam, Wales—Chapel	Calvinistic Methodists	W. Harris, Gilfach, Pengam.
8	Hastings—Repairs to Workhouse	Guardians	A. W. Jeffrey & Son, 5 Havelock Road, Hastings.
8	Manchester—Cactus Houses	Parks Committee	City Architect, Town Hall, Manchester.
8	Salisbury—Sash Screens	Guardians	J. Harding & Son, 58 High Street, Salisbury.
8	Dublin—Fire-station	Waterworks Committee	City Architect, Dublin.
9	Woodbridge Haven—Alterations to Coastguard Buildings	Joint Committee	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
10	Glamorgan—Police-stations	Rural District Council	T. M. Franklin, Glamorgan County Council Offices, Cardiff.
10	Omagh, Ireland—Cottages	Education Committee	W. Cathcart, Omagh.
10	Pleasley, near Mansfield—House	Great Northern Railway Co.	J. Perkin, Shirebrook, near Mansfield.
12	Dublin—Station Buildings, &c.	River Wear Commissioners	W. H. Mills, Amiens Street Terminus, Dublin.
12	Sunderland—General Offices, &c.	Rev. S. Jones	Henderson & Hall, 28 John Street, Sunderland.
12	Ynisher, Porth, Wales—Vicarage	Education Committee	G. S. Halliday, Cardiff.
12	Merthyr Tydfil—Altering Fireplaces	Education Committee	E. Stevens, Town Hall, Merthyr.
12	Merthyr Tydfil—Rooms at School	Education Committee	E. Stevens, Town Hall, Merthyr.
12	Merthyr Tydfil—Latrines, &c.	Lewisham Borough Council	E. Stevens, Town Hall, Merthyr.
12	London, S.E.—Footbridge	Hendon U.D.C.	Surveyor's Department, Town Hall, Catford.
12	London, N.W.—Shed	Town Council	S. S. Grimley, Council Offices, Burroughs, Hendon.
12	Crewe—Fire-station	Managers Central London Sick Asylum District	G. Eaton-Shore, Borough Surveyor, Crewe.
12	London, W.—Demolishing and Rebuilding Washhouse	Urban District Council	A. A. Kekwick, 18 Outer Temple, E.C.
13	Castlecomer, Ireland—Twenty Cottages	Asylums Board	T. Mahony, Clerk, Castlecomer.
13	Barming Heath, near Maidstone—Chimney Shaft	District Lunatic Asylum	W. J. Jennings, 4 St. Margaret's Street, Canterbury.
13	Atherton, Lancs—Fire-Engine House	Co-operative Society, Ltd.	F. H. Grimshaw, Town Hall, Atherton.
14	Roscrea, Ireland—Alterations to Post Office	Commissioners	O. Williams, Post Office, Limerick.
14	Rotherhithe—Boat Shed and Workshops	Urban District Council	Office of Board, Embankment, E.C.
15	Monaghan, Ireland—Asylum Buildings	Corporation	T. F. M'Namara, 50 Danson Street, Dublin.
15	Great Grimsby—Stables	Aberneil Building Company	A. Gooseman, Cleethorpe Road, Grimsby.
16	Wisbech—Enlargement of Post-office	Guardians	Secretary, H.M. Office of Works, Storey's Gate, S.W.
16	Cirencester—Rebuilding Pumping-Station	Urban District Council	Town Surveyor, Cirencester.
16	Stubbington—Coastguard Buildings	Corporation	Superintending Engineer, H.M. Dockyard, Portsmouth.
19	Glasgow—Boathouse	Guardians	Office of Public Works, City Chambers, Glasgow.
19	Cwmaman, Wales—Houses and Shops	Guardians	Smith & Davies, Aberdare.
19	Birkenhead—Sanitary Towers	Guardians	E. Kirkby, 5 Cook Street, Liverpool.
20	Alford, Lincs—Residence	Guardians	W. Mortimer & Sons, Corporation Street, Lincoln.
20	Lambeth—Conversion of School into Home	Guardians	W. Thurnall, Clerk, Guardians' Offices, Brook Street, Kennington Road, S.E.
20	Pontypridd—Additions to School	Education Committee	P. R. A. Willoughby, Surveyor, Pontypridd.
21	London, S.E.—Convenience	Southwark Borough Council	A. Harrison, Town Hall, Walworth Road, S.E.
24	Wombwell, Yorks—Library	Urban District Council	A. B. Linford, Carlton Villa, Wombwell.
28	London, S.E.—Stables	Lewisham Borough Council	Surveyor's Department, Town Hall, Catford.
28	Londonderry—School	Municipal Technical Construction Committee	D. Conroy, 21 Shipquay Street, Londonderry.
Jan. 4	Buxton—Milnthorpe Homes	W. G. Clarke	W. R. Bryden, F.R.I.B.A., Buxton.
4	Felixstowe—Coach-house	Co-operative Society	H. W. Buxton, 26 Hamilton Road, Felixstowe.
4	Dewsbury—Wesleyan Sunday School	P. R. Norton, Ltd.	Danby & Simpson, 73 Albion Street, Leeds.
4	Radcliffe-on-Trent—Shops		Calvert & Gleeve, Low Pavement, Nottingham.
4	Long Eaton—Ten Houses		E. B. Ridway, Main Street, Long Eaton.
No date	Dublin—New Maltings		Beckett and Metcalf, Surveyors, 10 Leinster Street, Dublin.
ENGINEERING:			
Dec. 8	Birmingham—Flood Works	Public Works Committee	City Surveyor, Council House, Birmingham.
8	Perth, Australia—Telephone Material	Guardians	General Post Offices, Perth, Adelaide, Melbourne, Australia.
10	London, S.E.—Electrical Traveller	Urban District Council	B. E. Nightingale, Albert Works, Albert Embankment, Lambeth.
12	Stockport—Wiring	Guardians	W. H. Ward, Paradise Street, Birmingham.
12	Erith, Kent—Gates	Gas Company	Hawthorne & Zedon, 9 Queen Street Place, London, E.C.
12	Macclesfield—Water-main	Gas Commissioners	Whittaker & Bradburn, 19 King Edward Street, Macclesfield.
12	Cannock—Gasholder	L.C.C.	T. A. Nicholls, Gasworks, Cannock.
12	Edinburgh—Purifying Plant House	Asylums Committee	W. R. Herring, Gasworks, Edinburgh.
13	London, S.W.—Seven Water Tanks	District Lunatic Asylum	County Hall, Spring Gardens, S.W.
13	Barming Heath, near Maidstone—Boilers, &c.	Cuckfield Rural District Council	W. J. Jennings, 4 St. Margaret's Street, Canterbury.
14	Malines—Bridges	Urban District Council	La Bourse de Commerce, Brussels, Belgium.
14	Edinburgh—Electric Lighting	Corporation	F. A. Newton, Dewar Place, Edinburgh.
16	Londonderry—Waterworks	Corporation	M. A. Robinson, Richmond Street, Londonderry.
16	Hayward's Heath, Sussex—Water-mains	Municipal Council	D. Rankine, Council Offices, Hayward's Heath.
20	Bangor, Ireland—Meters	Municipal Council	B. Mitchell, Bangor.
21	Amsterdam—Metal Superstructure for Bridges	Camberwell Borough Council	M. Nighoff, The Hague.
21	Cardiff—Pumping Machinery, &c.	Corporation	W. Harpur, Borough Engineer, Cardiff.
26	Leith—Tramway Cars	Corporation	T. B. Laing, Council Chambers, Leith.
26	Johannesburg—Cranes	Municipal Council	Mardey & Dawbarn, 82 Victoria Street, S.W.
27	Johannesburg—Transformer Pillars	Municipal Council	Mardey & Dawbarn, 82 Victoria Street, S.W.
31	Drogheda—Heating	Asylums Committee	Town Clerk, Courthouse, Drogheda.
31	London, S.E.—Electric Bells, &c.	Asylums Committee	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
31	London—Engineering Work	Asylums Committee	Engineer's Office, Public Health Department, Guildhall, London.
23	Epsom—Hot-water Plant, &c.	Asylums Committee	Clerk to Committee, 6 Waterloo Place, S.W.
28	Giurgevo, Roumania—Electric Light	Asylums Committee	Municipal Offices, Giurgevo.
April 1	Lulea, Sweden—Dredging	Asylums Committee	Harbour Office, Lulea, Sweden.
IRON AND STEEL:			
Dec. 12	Hendon—Iron Fire-escape Shed	Urban District Council	S. S. Grimley, Council Offices, The Burroughs, Hendon.
13	Hetton-le-Hole, Durham—Churchyard Fence	Urban District Council	J. Harding, Township Offices, Hetton-le-Hole.
15	Downpatrick—Fire-escape Stairs	District Lunatic Asylum	Medical Superintendent, Downpatrick Asylum.
24	Brazil—Metallic Wire	Central Railway	Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
PAINTING AND PLUMBING:			
Dec. 8	Sheffield—Plumbing and Glazing	Education Committee	Education Committee's Office, Leopold Street, Sheffield.
16	Barrow-in-Furness—Painting	Corporation	Borough Engineer, Barrow-in-Furness.
16	Salford—Painting	Education Committee	Director of Education, Education Offices, Chapel Street, Salford.
Jan. 1	London—Painting and Plumbing Work	Corporation	Engineer's Office, Public Health Department, Guildhall, London.
ROADS AND CARTAGE:			
Dec. 8	Ealing, W.—Making-up Roads	Town Council	C. Jones, Town Hall, Ealing, W.
8	Newport, Mon.—Street Improvements	Corporation	Borough Engineer, Newport.
10	Newcastle-on-Tyne—Supplying Stone, &c.	County Council	County Surveyor, Moothall, Newcastle.
12	London, S.E.—Kerbing	Lewisham Borough Council	Surveyor's Department, Town Hall, Catford.
15	Leicester—Granite	Corporation	E. G. Mawbey, Town Hall, Leicester.
16	Preston—Paving	Corporation	Borough Surveyor, Town Hall, Preston.
17	Maidstone—Materials	Bridges and Roads Committee	County Surveyor, Maidstone.
28	Carmarthen—Road Materials, &c.	County Council	C. H. Mounsey, County Surveyor, Carmarthen.
SANITARY:			
Dec. 8	Fordhouses, near Wolverhampton—Sewerage Works	Rural District Council	H. M. Whitehead, Penkridge, Sta.Ford.
13	Chippenham—Sewers	Urban District Council	A. G. Adams, High Street, Chippenham.
13	Southall, Middlesex—Sewerage Works	Urban District Council	R. Brown, Public Offices, Southall.
17	Spennymoor, Durham—Disinfectants	Urban District Council	Sanitary Inspector, Spennymoor.
19	Birkenhead—Sanitary Tower, &c.	Guardians	E. Kirkby, 5 Cook Street, Liverpool.
20	Cheltenham—Sewerage Works	Rural District Council	N. Larley, Sanctuary, Westminster, S.W.

Electrical Notes.

The Bastian Mercury Vapour Lamp.

Some time ago we described this lamp in principle, but it was then not on the market. It has now been perfected and made in a commercial form, and the sole selling agents, Messrs. Rumney & Rumney, of 39, Victoria Street, are in a position to supply it. We draw special attention to this lamp as it marks the latest advance in electrical illumination and is also the most efficient. It is highly suitable for the lighting of large halls, yards, streets, &c., and whilst cheaper than an arc lamp, it consumes no material and requires hardly any attention. The unpleasant effect of the mercury rays is overcome by the insertion, if required, of a small filament lamp which has sufficient red rays to neutralize the ghastly effect otherwise obtained, although this is of no special consequence in goods yards, &c. The lamp at present only works on continuous current circuits, but an alternating current type is being designed. The Improved Glow Lamp Company have made special fittings for the lamp, particularly in connection with street-lighting. Working on 200 to 250-volt circuits, the lamp takes from '25 to '3 ampere, and gives a candle-power of from 120 to 160. This shows an efficiency of about '4 watt per candle-power, which compares very favourably with arc lamps.

Iron Lightning Conductors.

If there is one authority in the country on the effects of lightning it is Sir Oliver Lodge. At a recent lecture on this subject before the Birmingham Architectural Association he stated, contrary to the usually accepted fact, that an iron conductor was more satisfactory than a copper one. The latter did not damp out the oscillations of the discharge, was liable

to side flashes, and let the current down too suddenly. Even a small iron wire was sufficient, and whilst the flash might fuze up the wire, by the time it was over the wire would have served its purpose. He thought it was better to have a number of cheap conductors than a few expensive ones. In the case of dangerous buildings, like magazines or powder factories, it was desirable to be absolutely immune from lightning, and the only thing to do then was to encase the whole building with metal, and also to have a few sky terminals so that the charge should not be retained. A number of experiments were shown to illustrate the lecture.

Electricity in Cotton Mills.

This question is receiving considerable attention at the present time, particularly owing to keen competition amongst various cotton manufacturing countries, and also because of the hardships due to sudden shortages, which make cheap productions a necessity. An interesting installation of this kind is about to be fitted up by Messrs. Mather & Platt in Spain, the work having been obtained in competition with several Continental firms. The mills belong to the Larios Co., and employ 5,000 hands. There will be 72 motors aggregating some 2,500 horse-power, and varying in size from 3 to 150 horse-power, and it is assumed that 20 per cent. in power cost will be saved annually. The electrical energy will be obtained from Malaga, where there is a sub-station fed at a pressure of 25,000 volts three-phase current from the Chorro Falls, 50 miles distant. At Malaga the pressure is reduced to 2,500 volts, and Messrs. Mather & Platt will begin their work at this place, running under ground cables to the mills half a mile distant, where the pressure will be further reduced to 400 volts. A large amount of work of this sort is

being carried out now in America, where some 140,000 horse-power is being used for driving by electric motors. The Americans are very keen on turbo-generators for the prime movers, which occupy only one-fifth the floor space and two-thirds the height of Corliss engines, apart from being extremely simple and easy to manage. Undoubtedly in mills of this sort, where there is such a large amount of machinery, the abolition of most of the belting and shafting is a considerable gain both as regards power and upkeep, whilst in the matter of turbo-generators and three-phase current the speed is so absolutely constant that manufacturing is carried on under the ideal conditions required for cotton spinning. A.M.I.E.E.

The Tender of Messrs. Clark, Bunnett & Co., Ltd., of New Cross, has been selected for three electric goods lifts and one electric passenger lift at the new premises at Bristol for the Co-operative Wholesale Society, Ltd.

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- DURRON BRICK AND TILE CO., LTD., Duffon, Queen's County, Ireland. Capital: £15,000.
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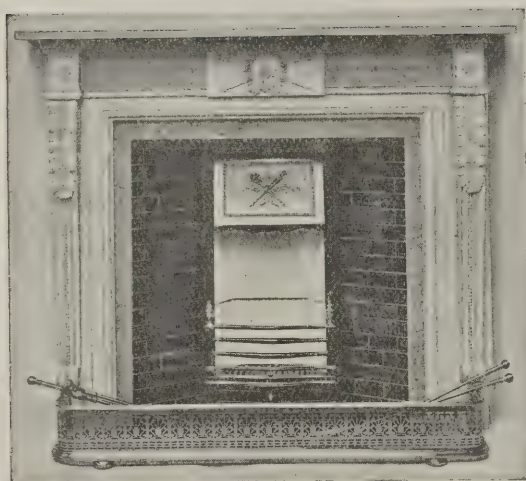


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December 9th. Special General Meeting at No. 18, Tufton Street, Westminster, at 7.15 p.m., to pass a new byelaw. An Agenda is posted up at 18, Tufton Street.
December 9th. Ordinary General Meeting at No. 18, Tufton Street, Westminster, at 7.30 p.m. Paper by Mr. T. RAFFLES DAVISON, entitled "Some Architectural Reflections."

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The specification, conditions of Contract, and drawings of the proposed building may be seen on and after MONDAY, the 12th DECEMBER next, at the Offices of Messrs. HENDERSON & HALL, Architects, 28, John Street, Sunderland, from whom copies of the bill of quantities and form of Tender may be obtained on the payment of a fee of 5 guineas, which will be returned to those who send in a bona-fide Tender.

Sealed Tenders, endorsed "New Board Room and Offices," are to be delivered to the undersigned before NOON on WEDNESDAY, the 4th JANUARY, 1905.

The Commissioners do not bind themselves to accept the lowest or any Tender.

The successful Tenderer will be required to enter into a bond with two approved sureties for the due performance of the Contract, and no work will be ordered under the Contract until such bond has been duly executed.

J. G. MORRIS,
Clerk to the Commissioners.
Clerk's Office, Commissioners' Quay,
Sunderland,
14th November, 1904.

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Sealed Tenders, in the envelopes provided, endorsed "Tender for making-up —," must be delivered at my office not later than FOUR p.m. on THURSDAY, the 8th day of DECEMBER, 1904.

The Council does not bind itself to accept the lowest or any Tender.

Dated this 23rd day of November, 1904.

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See p. xx for the Employment Register.

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To Contributors.

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OFFICE: 6, GREAT NEW STREET, FETTER LANE, E.C.

TENDERS—cont. from p. xiii.

Orpington.—For the erection of six pairs of semi-detached villa residences in High Street. Mr. St. Pierre Harris, architect, 8, Ironmonger Lane, E.C., and Orpington:—

W. Owen	£730	at per pair.
A. Pannett	690	

Orpington.—Accepted for the erection of a pair of semi-detached villa residences in High Street, for Mr. Davis. Mr. St. Pierre Harris, architect, 8, Ironmonger Lane, E.C., and Orpington:—

A. Pannett	£650	
-------------------	------	--

Orpington.—For alterations and repairs to private residence. Mr. G. St. Pierre Harris, architect, 8, Ironmonger Lane, E.C., and Orpington:—

R. A. Lowe	£210	0 0
T. Knight	197	0 0
Somerford & Son	195	5 0
H. Glassup*	168	10 0

* Accepted.

Orpington.—For the erection of a pair of semi-detached cottages. Mr. St. Pierre Harris, architect, 8, Ironmonger Lane, E.C., and Orpington:—

R. A. Lowe	£699	0 0
T. Knight	609	0 0
Somerford & Son	560	0 0
Smith	556	0 0
A. Pannett*	539	13 0

* Accepted.

Solihull.—For the erection of new dépôt, &c., for the Solihull Rural District Council. Mr. A. E. Curral, surveyor:—

Alternative estimate.

T. Rowbotham	£3,437	0 0
Baker & Warr	3,308	6 c
W. C. Channing, Handsworth	3,142	0 0
T. A. Smith, Moseley	3,140	0 0
J. Dallow & Sons, Blackheath	3,140	0 0
W. Bishop, King's Heath	3,056	0 0
W. Sapcote	3,042	0 0
T. A. Turton	3,036	0 0
W. Jackson, Langley	3,020	0 0
T. & W. Thompson, Solihull	2,935	0 0
E. Crowder	2,925	0 0
W. A. Woods, Hockley Heath	2,924	8 4
T. A. Cole & Son, Selly Oak	2,916	0 0
W. H. Gibbs, King's Heath	2,900	0 0
B. Whitehouse & Son	2,899	0 0
H. J. Pitts	2,898	0 0
C. A. Horton, Brierley Hill	2,896	0 0
A. C. Hughes	2,867	0 0
Gowing & Ingram	2,843	0 0
Bragg Brothers, Solihull	2,821	0 0
H. Gregory, Olton	2,768	0 0
C. Hope, Berkswell	2,590	0 0

* Accepted.

[Rest of Birmingham.]

South Shields.—For the erection of new operating theatre, for the Ingham Infirmary, Westoe, South Shields. Mr. F. Rennoldson, architect, 37, King Street, South Shields. Quantities by the architect:—

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J. Carruthers	2,145	5 2
W. Wilson & Sons	2,144	6 10
J. C. Nichol	2,141	8 0
J. Young	2,128	17 0
W. J. Robertson & Sons	2,100	0 0
A. Ross	2,092	8 6
R. Harper	2,076	7 3
W. Allison	2,020	0 0
T. Banks	1,981	15 10
T. W. Turner & Co.	1,961	12 5
J. Christie*	1,900	5 0

* Accepted.

Torquay.—For the erection of a new wing and for structural alterations at Villa Syracuse, for the Torquay Hydropathic Co., Ltd. Quantities by the architects, Messrs. Johnson & Webber, Tormoham Manor office, Torquay:—

Lewis Bearne, Newton Abbott	£6,437	0 0
H. C. Goss	6,229	0 0
John Smerdon	6,125	0 0
J. C. Parker & Sons	5,999	10 0
S. Blatchford	5,997	0 0
R. F. Yeo & Sons*	5,987	0 0
T. Vanstone	5,788	0 0

[Rest of Torquay.]

* Accepted subject to certain reductions.

Truro.—For proposed sea-wall, &c. (section No. 1), for the River Commissioners. Mr. Measham Lea, city surveyor:—

Tilbury Contracting and Dredging Co., London	6,620	13 11
E. H. Page, Cardiff	6,519	9 c
Pethick Brothers, Plymouth	5,619	0 0
W. E. Blake, Plymouth	4,920	0 0
T. Rickeard, Penryn	4,882	6 0
Leggott & Speight, Hull	4,771	3 0
J. Collier, Truro	4,255	1 3
Ellascott & Sons, Plymouth	3,495	14 0

* Accepted

Quantity Surveyors' Association.—At a meeting held last week at the Holborn Restaurant, Mr. Walter Lawrance, F.S.I., president, stated that—although the Surveyors' Institution had at first raised objections—the Board of Trade had granted a licence to the Association, but could not grant the sole use of the letters Q.S.A., as that right was only to be acquired by Royal charter. The first annual dinner of the Association is proposed to be held in February and the annual general meeting in May.

THE BUILDERS' JOURNAL SUPPLY DEPARTMENT.

Following our settled policy of helping our subscribers in every way possible, we have decided to inaugurate a department for the supply of drawing office requisites of a reliable nature, and at low prices.

We have been able to make satisfactory arrangements with the best manufacturers, and we propose to publish from time to time illustrated lists of the articles supplied with prices, &c., as follows:—

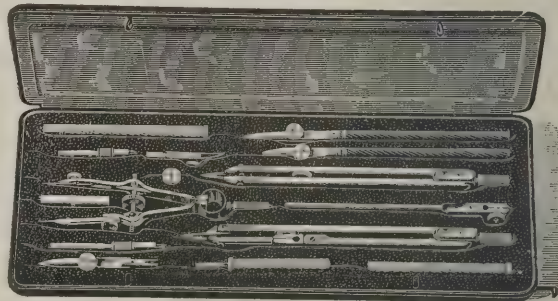
- No. 1 List. Sets of Mathematical Instruments.
- No. 2 List. Various Scales and Philotechnic Set.
- No. 3 List. Drawing Boards, T Squares and Set Squares.
- No. 4 List. Drawing and Tracing Paper, Tracing Cloth, &c.
- No. 5 List. Inks, Water Colours, Paints, Brushes, &c.

LIST No. 1—PART II.

MATHEMATICAL INSTRUMENTS.

No. R 6.

Solid Leather rod-fastening Pocket Case, containing German silver instruments, 6-in compass with knee joint, pen and pencil legs, lengthening bar, improved hair-spring divider, bow compass, two metal pen or pencil leg holders, 2 hand-ruling pens, and combination case of leads and compass key. Price 45/-

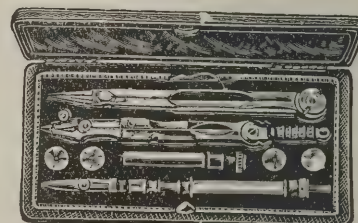


No. 46.



Morocco pocket case, silk lined, electrum name plate in centre of lid, and lift-up flap, containing the following superior German silver instruments:—Compass with double knee-joints and needle-points, pen and pencil points, lengthening bar, hair-spring divider, three needle-pointed spring bows, ink and pencil needle-pointed double knee-jointed bows, jointed ivory pen, steel ditto, with ivory parallel and protractor. Price £3 3s.

Nos. 69-40.



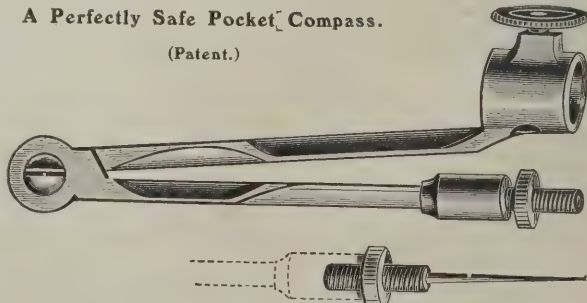
Handsomeness snap case, with name plate, containing bayonet adjustment double knee-jointed compass (electrum) with bow-head and points to hold needles or leads, combination pen point and handruling pen adjustable to compass, with or without bar-handle, fine divider with deep hollow, case for leads and needles, drawing pins and compass key. Price 11/6

A Perfectly Safe Pocket Compass.

(Patent.)

This Compass has a Reversible Point fitted with double screw ends. It takes any pencil, is easily adjusted, and always ready for use.

Price 9d. each.



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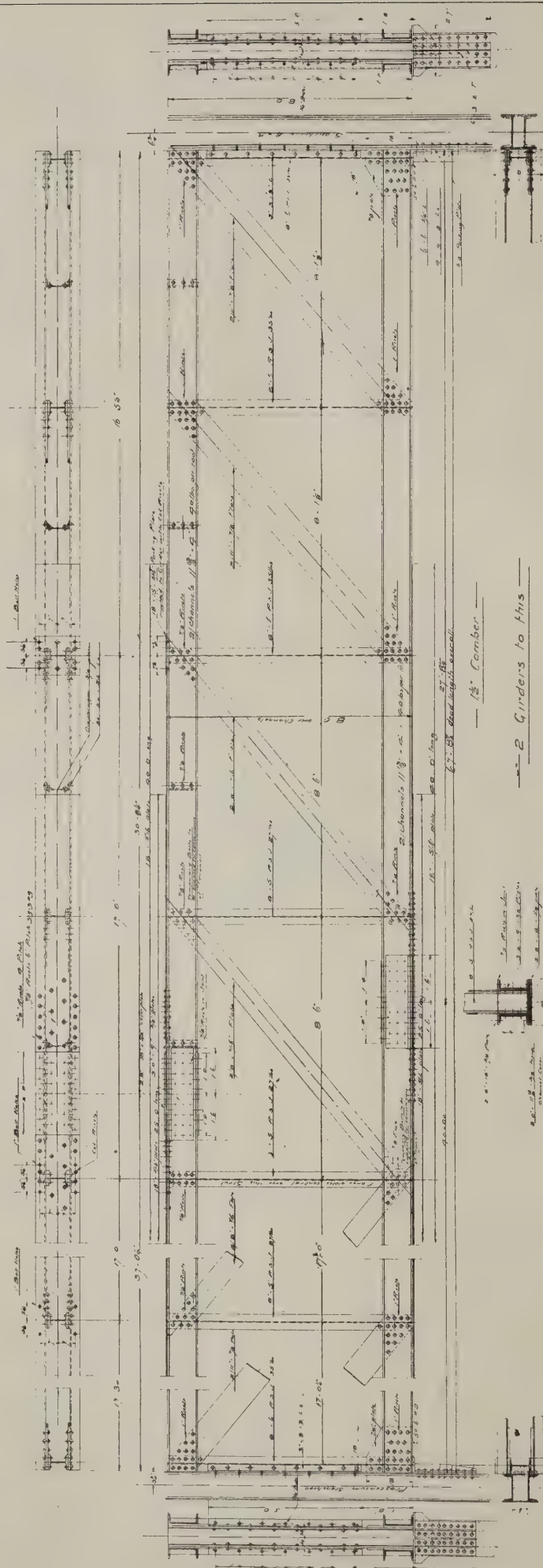
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— Drawing No. R. 1 —

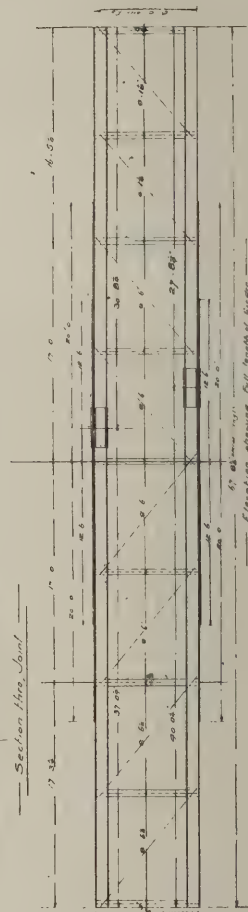
CONTRACT NO. 7042.

— Detail of Main Girders to Roof —

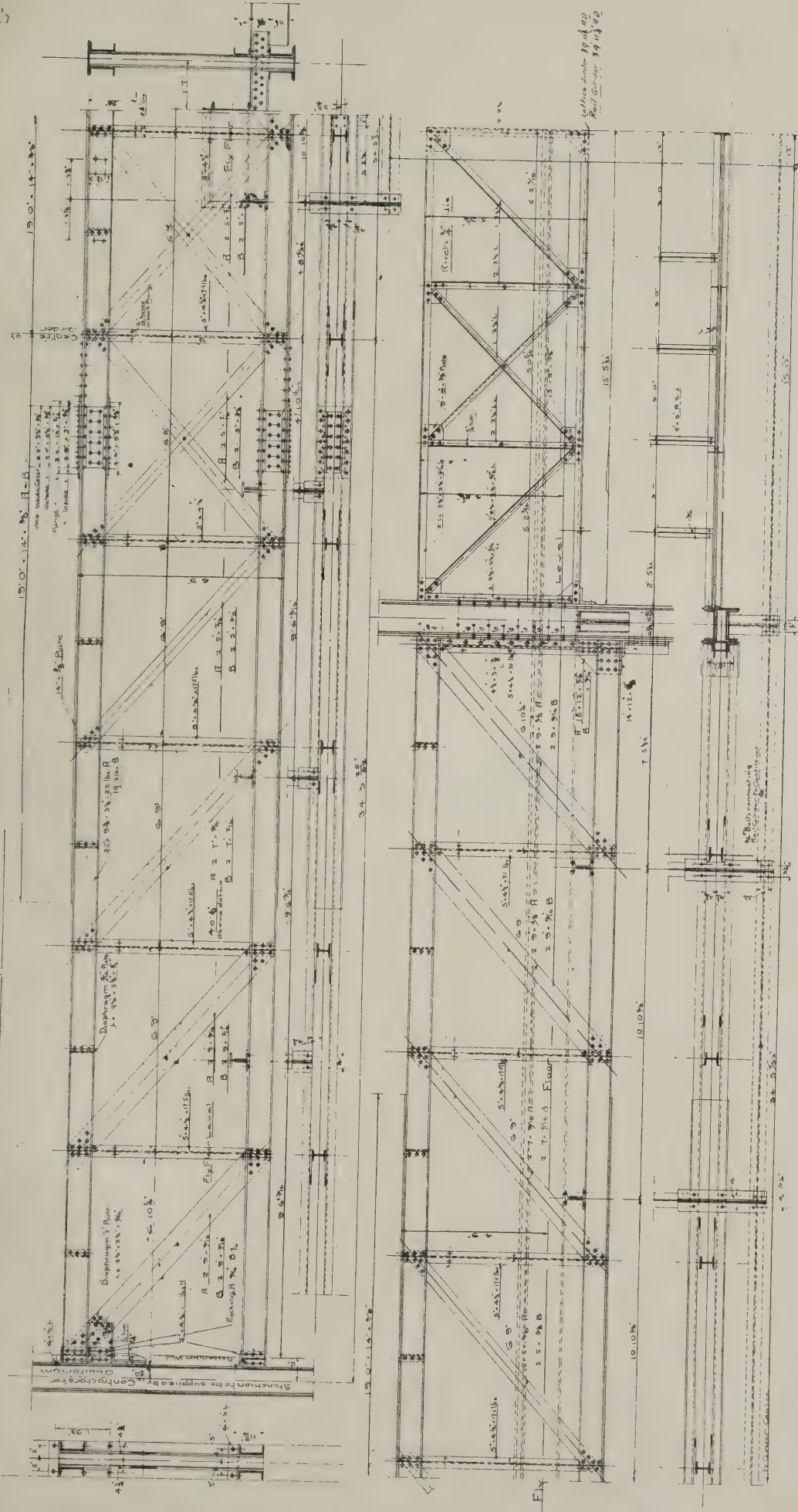


— 2 Girders to this —

— Section Hrs. Joint —



Contract No 7042 — Detail of Fly Girders



2 Girders Rep'd as drawn Marked A That is 1 Large & 1 Small Sider
 2 " " Opposite Hand " B Lighter Scantling do
 Main Girders to be despatched in halves & joint covers loose

Large Girders cambered 1/8" Small one 3/8"
 Rivets 3/8" dia & 4" Pitch unless otherwise shown
 Dotted lines indicate implan. elevation indicate 48" x 18" x 1/4"
 Rail 7" base feet & 5/8" deep riveted on top

Joint here with bar
 48" x 18" x 1/4" with 6
 3/8" base feet joint

Letter under 39 1/2 1/2
 Rail 7" base 39 1/2 1/2

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

December 14, 1904. Vol. 20, No. 514.

6, Great New Street, Fetter Lane, E.C.

Summary.

The R.I.B.A. and allied Societies have memorialized the municipal authorities throughout the Kingdom against the employment of their officials, engineers and surveyors for the design of architectural works. (This page.) When this matter was brought up before the Berwick Town Council the mayor termed the Institute's action as impudent interference. (Page xi.)

It is probable that the proposal to enlarge the constitution of the Tribunal of Appeal under the London Building Act will not be proceeded with. (Page xi.)

There are now 12,500 registered plumbers in this country. (Page 316.)

The Birmingham Building Trades Federation has been dissolved, so that each trade now stands by itself. What the masters will do remains to be seen. (Page 316.)

The conditions in competitions for a school at Cheltenham; a chapel, &c., at Swansea; and the Northumberland War Memorial are unsatisfactory. (Page xi.)

The revolving stage at the London Coliseum weighs 160 tons and can be run at any speed up to 20 miles an hour. It consists of three rings having a total diameter of 75ft., built up on steel underframes 9ft. high, and instead of the motive power and wheels being on the carriages there is a run-way on the underframes, thus reversing the usual order of things and securing considerable lightness, absence of moving contacts for current and a very great reduction in noise. (Page 312.)

The restoration of Peterborough Cathedral is stopped for want of funds. (Page xiii.)

In the R.I.B.A. November examinations 33 out of 73 passed the Final, 62 out of 121 passed the Intermediate, and 100 out of 136 passed the Preliminary. (Page 322.)

The architects of Ireland very much resent the appointment of an English architect for the new College of Science in Dublin. (Page xi.)

Mr. E. M. Gibbs suggests that if ever the Sheffield Water Department do away with one of their large dams at Crookesmoor there would be an opportunity for forming an exceptional place for sports and great meetings, like the stadium at Athens, which has marble seats in sixty tiers, accommodating 50,000 people. (Page 318.)

"Design with Beauty, Build with Truth." That motto of the Architectural Association, said Mr. Raffles Davison last Friday, demanded the two things to be done together. Building with truth alone would not do, though some of the latest apostles of art seemed to suggest so. (Page 317.)

Architects for Municipal Work. LAST January the Council of the Royal Institute of British Architects, having had their attention directed to the growing practice of county and municipal authorities entrusting architectural work to their paid officials, appointed a committee to enquire into the question, consisting of Messrs. J. J. Burnet, H. T. Hare, E. W. Mountford, W. H. Seth-Smith, John W. Simpson and all the presidents of the allied societies. The outcome of this has been that in the last few days a memorial signed by the presidents of the Institute and of the architectural societies in alliance therewith throughout the United Kingdom has been sent to all the county councils, municipal councils and district councils of any importance in the Kingdom—nearly 1,600 such bodies in all having been approached. The memorial, after referring to grave interests of an artistic, practical and financial nature which are involved by the employment of county and municipal officials to execute works of architectural importance, and to the general welfare of the community necessitating the regulation of such employment by certain conditions, points out "(1) That when the official is an engineer or surveyor, the artistic aspect of buildings designed by him is apt to be overlooked or misunderstood by reason of his not having received the artistic training of an architect. (2) That the engineer or surveyor in planning and arranging buildings is fettered by the lack of the expert knowledge possessed by architects. (3) That greater expense is incurred by employing an engineer or surveyor than by employing an architect. Non-expert planning entails unscientific distribution and consequent expense in construction, often leading to subsequent alterations which involve waste of public money, the amount of which is impossible to be ascertained owing to the complicated nature of official departments. The saving of an architect's fees is undoubtedly false economy. It is the function of an architect to obtain for his client the best value for money expended, which special experience not possessed by an engineer or surveyor alone enables him to do; further, his independent position compels him to exercise a closer control over expenditure than the salaried official, whose purely personal interests are not intimately involved. (4) That the time of a county or municipal official is so greatly occupied with administrative work that it is impossible for him, when entrusted with any building scheme of first-class importance, to devote the requisite attention to the essential considerations of artistic design, expert planning and economic building. Such work is inevitably referred to irresponsible assistants, and an unsatisfactory and expensive building is the result."

The memorial then urges upon county and municipal authorities: "(1) That architectural work be not placed in the hands of engineers or surveyors. (2) That where it is deemed desirable for architectural work to be carried out by a county or municipal official, such official shall be required to have passed the qualifying examinations of the Royal Institute of British Architects. (3) That the work of an official architect be restricted to structures of secondary importance, and that all buildings of a monumental character be entrusted to independent architects to be selected in such a way as may seem best to the local authority." The special committee appointed by the Council, of whose labours this memorial is the outcome, as a first step sent out a series of questions, the general consensus of replies to which is in conformity with the statements and recommendations in the memorial. Several points having a general bearing on the subject are, however, of interest. The only towns in the United Kingdom where there is a "City Architect" are Bradford, Hull, Nottingham, Dublin, Dundee, Aberdeen and Leith. It was agreed that from an artistic point of view it would not be advantageous to establish an official architect's department for local works, though financially much might be said in favour of the establishment of such a department. It was suggested that the work entrusted to the Architect's Department of a corporation should be restricted to utilitarian buildings under a certain limit of cost. The foreign correspondents of the Institute supplied information as to the practice of American and Continental authorities in dealing with local public works, from which it appears that only France and Spain have any means of supervising local bodies. In the former country all designs have to be submitted to a departmental commission called the "Commission for Civil Buildings." When municipal or departmental designs necessitate loans they are all sent to Paris, to the Minister of the Interior, who consults "the General Council for Civil Buildings" before giving permission to those communes considered as "minor." In Spain all architects are diplomated by the Government after going through the courses at the official schools of architecture (at Madrid and Barcelona), and each municipality has its official architect or architects, though competitions are held for important buildings. The action of the Institute we hope and believe will succeed in effecting a reform. The memorial should not be confined to local municipal bodies, but should also be sent to the chief Government Departments, harbour and asylum boards, gas, water, dock, railway and tram companies and all bodies who have powers granted by Parliament.

THE LONDON COLISEUM.—III.

WE have already published particulars of much of the builders' and decorators' work at the London Coliseum in St. Martin's Lane, and in view of its nearness to completion (the date of opening being announced for December 19th) we now conclude our description of the building by gathering together additional particulars of portions of the work dealt with before and information on portions not previously referred to.

Builders' Work and Joinery.

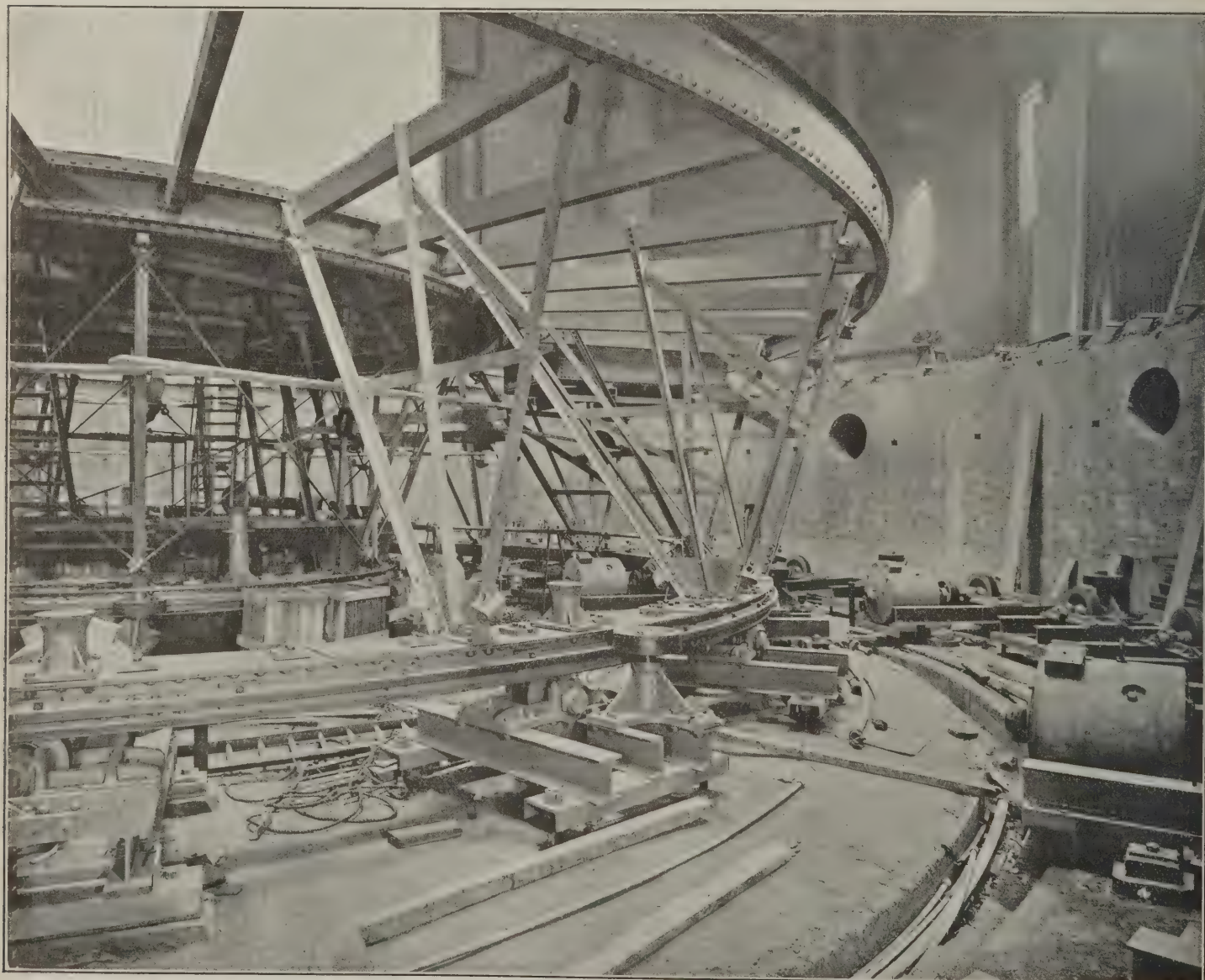
Messrs. Patman & Fotheringham, Ltd. (Mr. James F. Parker, managing director), commenced their operations on May 24th, and took up the entire work started by the Coliseum Co., including completing the walls of the stage and proscenium and auditorium and the entire building of the St. Martin's Lane block, comprising the grand entrances, vestibules, foyer, tea-rooms and offices, saloons, smoke-rooms, &c.; fixing the roofs over the whole of the site, forming floors and circles, and completing the drawing-room block, as well as (in the space of six weeks) entirely building the portion of the latter at the corner of May's Buildings and Bedfordbury, including pulling down the old "Black Horse" public-house. The short time allowed for the whole work, namely, just over six months, made it necessary to proceed continually both day and night for the

greater portion of the time, the works being temporarily lighted principally by electricity. 13½ millions of bricks have been laid in the walls, and, in addition to the constructional steelwork, 150 tons of steel joists, &c., were fixed by Messrs. Patman & Fotheringham; 13,400 super. yds. of concrete were laid in the floors, roofs and circles, for which more than 1,000 tons of Portland cement were used. Over 14,000 yds. of plastering were executed in finishing the walls and ceilings, in addition to the ornamental plastering. The majority of the roofs are covered with asphalt, besides which about 30 tons of lead have been laid on the stage portion; 15,000 cub. ft. of terra-cotta have been fixed in the various elevations and tower. In addition to the enormous amount of work executed on the site, some hundreds of men have been employed in preparing the joinery for the building, the cost of this amounting to about £10,000. The whole of the front entrances in St. Martin's Lane have been prepared in Austrian wainscot polished oak, glazed with plate glass with double bevelled edges, the entrance doors and inner doors to the grand vestibule and the carving being notable. The American bar fronts in the foyers are of wainscot oak, and the doors to the Royal box and retiring-room and doors to boxes have panelled architraves. The tea-rooms are fitted up with specially-designed counters and serveries, and the walls treated with ornamental panelling having pilasters, pediments and arcadings. The barriers at the back of the

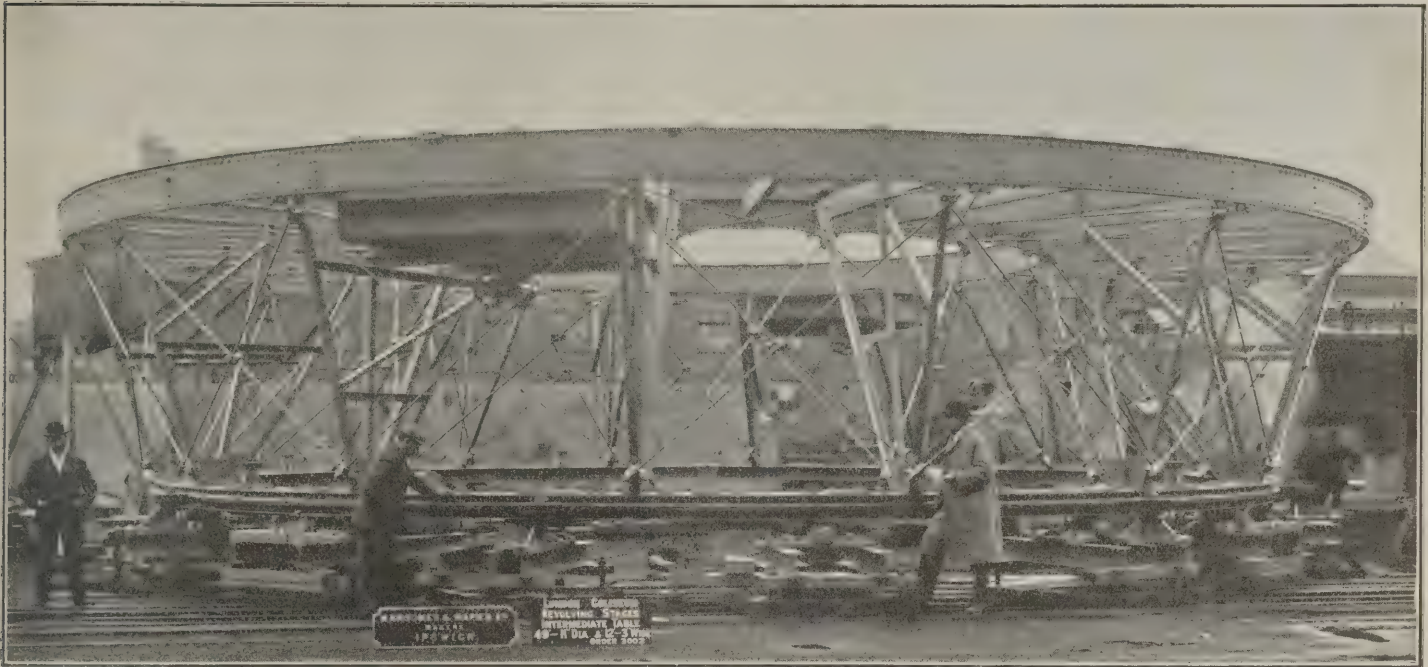
dress circle and grand tier are executed in Austrian wainscot oak with carved newels, moulded plinth and cappings. The barriers at the sides of the balcony are in mahogany with circular fronts, balusters, &c., the back barriers being in teak. The handrails to the grand staircase are of bronze with ornamental brackets fixed to the marble work, those to the dress circle and grand-tier staircases, and also the steppings at the sides of the circles, being in brass. More than 3,000 scaffold poles and thousands of cords were used in the scaffolding in the auditorium; scaffolders were working night and day for two weeks in erecting it, the striking and removal occupying two days and two nights.

The Structural Steelwork of the Stage.

In this issue we publish some of the working drawings of the steelwork of the flies, bridges, grid and other parts of the stage. This was designed, built and erected by Messrs. Drew-Bear, Perks & Co., Ltd., of Wellington Road, Battersea, S.W., who supplied 160 tons of steel for this portion: two girders weigh 10 tons each. The stage measures 83ft. from back to front, the average width being 120ft. The height from the floor of the stage to underside of grid is 71ft., and 81ft. from stage to roof. The stage is free from any obstruction, with the exception of two stanchions at the back, which are at 61ft. centres and 15ft. from the back wall. These stanchions are 81ft. long and were delivered in two pieces, which were even then of such length as to be difficult to handle in the confined area.



THE REVOLVING STAGE AT THE LONDON COLISEUM.



The girders, some weighing 8 tons, were lifted in one piece and placed in position by a timber derrick 80ft. high. The flies are 43ft. above the stage floor and are carried on girders 68ft. long weighing about 6 tons each. The roof-trusses are carried on two main girders, each 68ft. long, 8ft. in depth and weighing about 10 tons. The roof-trusses are formed of lattice-girders of 62ft. span, 10ft. deep, weighing $4\frac{1}{2}$ tons each: the grid is carried on their bottom booms. Across the stage runs a girder of 100ft. span carrying a run-way for working panorama scenes. This girder is extended into the scene dock by another lattice-girder 46ft. long. Behind this girder is a travelling gantry. On the grid over the stage are the pulleys for working the scenery cloths. The factor of safety adopted in the calculations was 4.

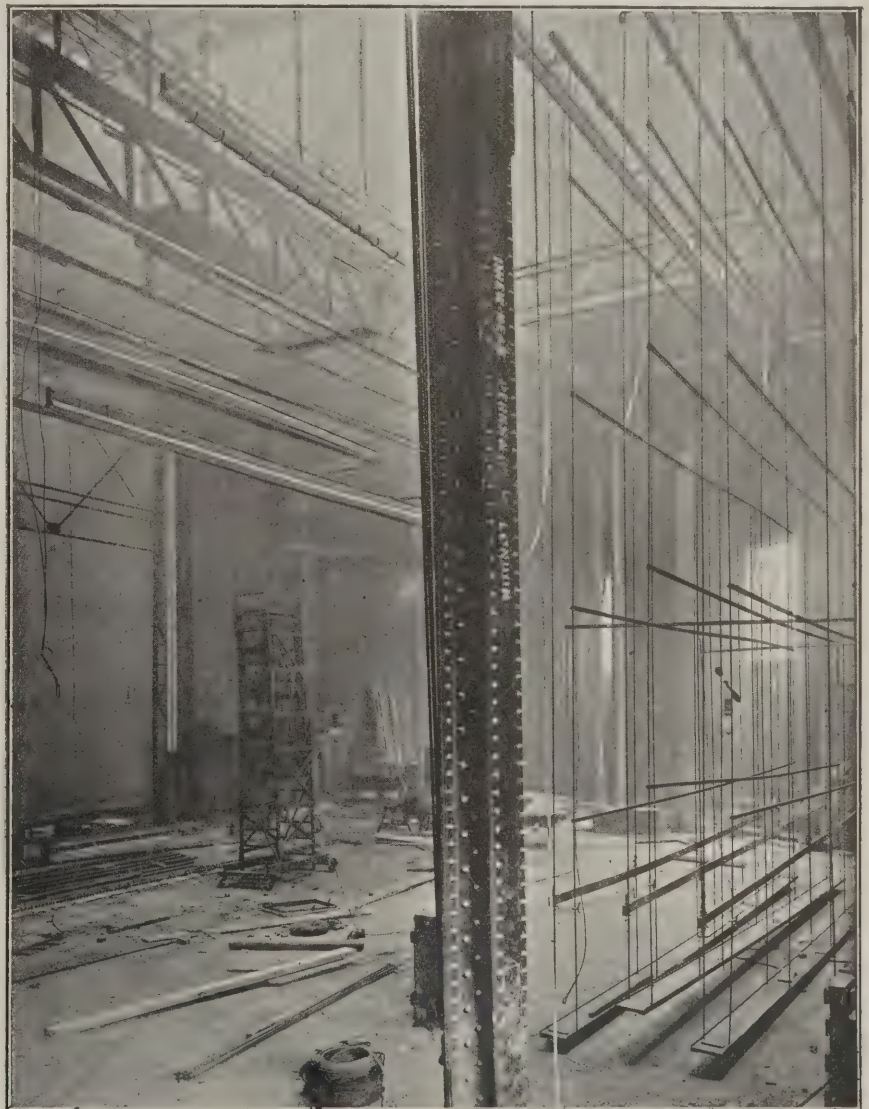
The Stage.

There is no similar arrangement of stage in the world; so that the details have had to be worked out entirely without reference to any similar apparatus or mechanism as a basis; and by reason of the size of the tables—as the three concentric rings of the stage are termed—it was not possible to carry out any experiments before placing the contracts. Of the three rings constituting the stage, the outer and intermediate ones are 12ft. across and the centre one 25ft. 7ins. Across the three the diameter is 75ft., and so accurate has been the building up that a total clearance of 6ins. only is necessary—1in. between each ring—to permit the tables to run separately without rubbing. It is possible to run them at any speed up to 20 miles an hour, and no vibration is apparent in the building. The tables are built up on rolled steel underframes 9ft. high, and instead of the motive power and wheels being on the carriages, as in a tramway, the engineer has designed a runway on the underframes, which travels on the motors, thereby reversing the usual order of things and securing considerable lightness, absence of moving contacts for current, and a very great reduction in noise. The rings can be run in either direction as separate pieces, or can be locked together for combined effects, and though each has its own set of motors they can be combined for purposes of heavy work.

The top staging for actual use is constructed of $2\frac{1}{2}$ in. teak, and is screwed to the underframe, with a layer of compressed felt between. The fourteen electric motors used for driving the rings are all set on adjustable beds for level-

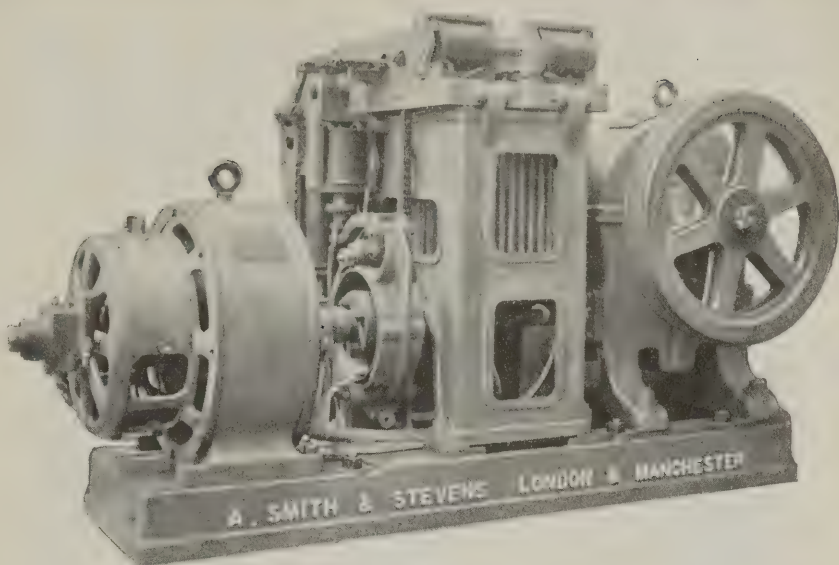
ling up to the permanent stage surrounding the outer ring, and the motors are all controlled from three special switch pillars on a raised gallery on the prompt side of the stage.

In connection with these are the interlocking electric and hydraulic breaks, besides indicators. The signalling to the drivers is by means of a special form of ship's engine-room



GENERAL VIEW OF STAGE, SHOWING FLIES AND BRIDGES.

Cranston & Elliot, Ltd., of London and Edinburgh. The scheme throughout is luxurious, the carpets being of special design: that of the auditorium being Roman in character. The vestibule has a handsome heavy pile carpet of rich blue colour, with Roman key border, this design and colouring of carpet being carried up the main stair-cases, the heavy stair-rod of which are in copper. In the stalls one is struck by the rich crimson super Wilton carpet, the gangways being covered with a Saxony Wilton carpet of similar design, the whole underlaid with thick felt. On this level is the Royal box and retiring-room, similarly carpeted in crimson; as also the foyer, boxes, dress circle, grand tier, balcony and the stairs leading to these. The ladies' room to the left of the grand saloon has a rich blue carpet, and the corridors running from the dress circle to the foyer have a specially woven runner. The tea-rooms behind the dress circle, grand tier and balcony are covered with super Wilton carpet in a soft shade of green, while the directors' room, managers' room, press-room and the accountants' room on the auditorium floor-level have heavy pile carpets of a suitable design. The principal dressing-rooms also have thick pile carpets of crimson colour, the numerous other dressing-rooms being covered with cork carpet. The scheme of colouring throughout is harmonious. The work was carried out under the personal supervision of Mr. R. E. Cranston, and the whole of the carpets and floor coverings—totalling $7\frac{1}{2}$ miles—were dyed, woven, made and laid in seven weeks only.

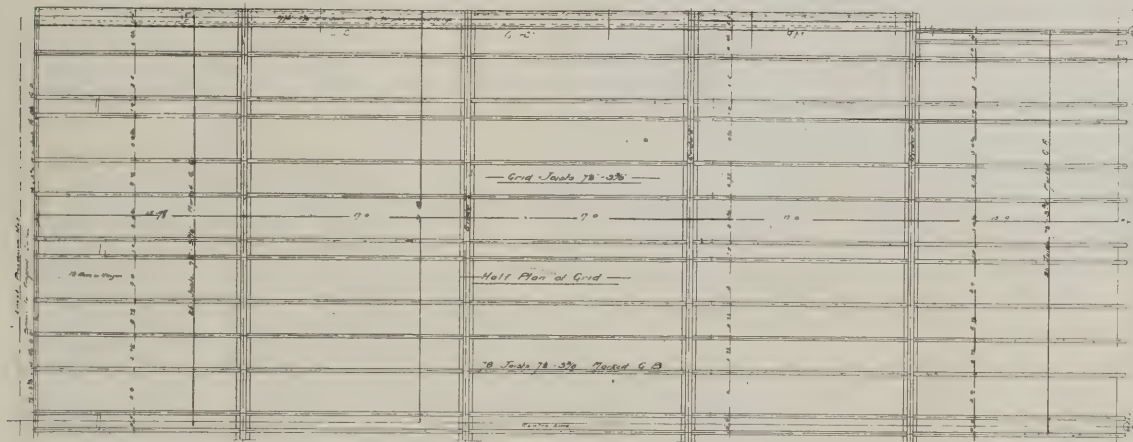


WINDING GEAR FOR ELECTRIC LIFTS AT THE LONDON COLISEUM.

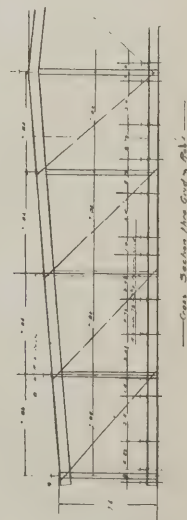
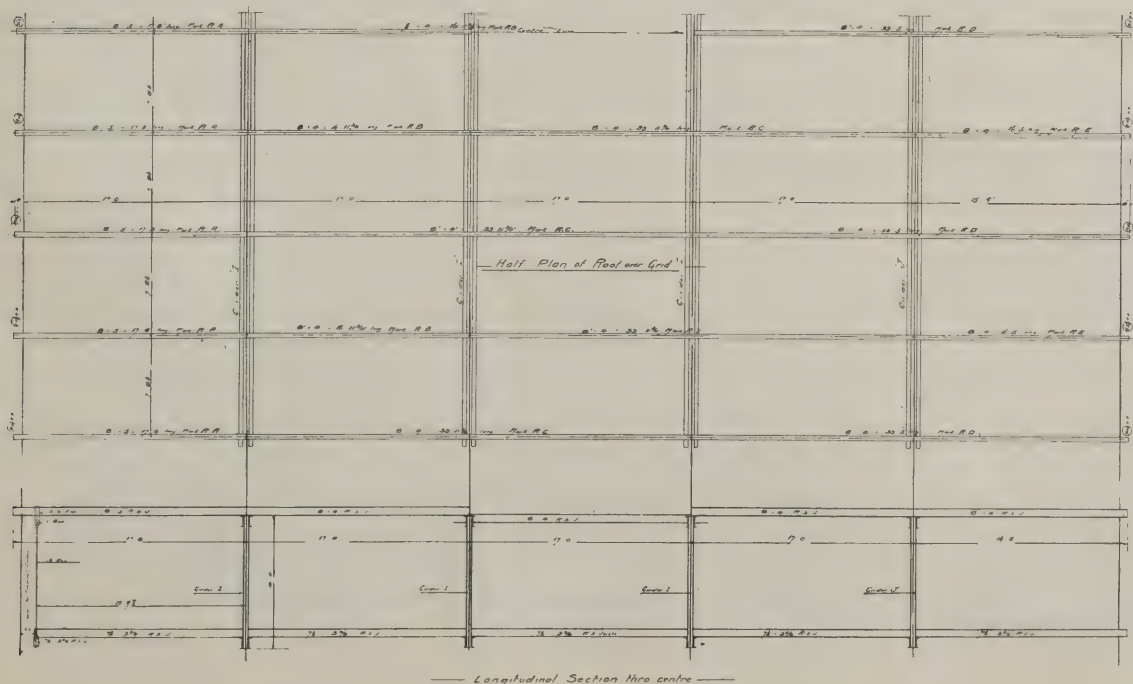
Electric Lifts.

Two electric lifts are provided in the entrance hall for taking the audience to the upper tiers. These have been supplied and erected by Messrs. Archibald Smith & Stevens, of Queen's Road, Battersea. The machinery for them is fixed in a motor room overhead. Control is by a switch in the car arranged

on the most up-to-date principles. Owing to the special conditions, wood does not enter into the construction of the lifts (except for the cages), all guides, &c., being of polished steel. Three methods of automatically preventing overwinding are employed, and the cages are fitted with a patent gravity safety apparatus which would stop the cage in the



LONDON COLISEUM. PLANS, SECTIONS, ETC., OF GRID AND ROOF.





THE LONDON COLISEUM.

event of any of the lifting ropes stretching or breaking; the heavier the load the tighter the cage is gripped to the guides. This safety gear has now been fitted to upwards of 5,000 lifts and in no single instance has it ever failed to stop the cage when a rope has broken.

Electric Lighting.

The electric-lighting equipment of the building has been designed on the most up-to-date lines, and follows the latest and most approved methods of theatre-lighting. Although of course the decorative effects of the interior and exterior have been specially studied in this respect, as also the stage illumination, nothing has been lost sight of which could in any way fail to ensure the safety of the public. Firstly, the lighting does not depend on current from one source, but the mains of two supply companies are taken into the basement, and the wiring of the whole building is split up between these two sources, so that it is impossible for an accident to one supply to plunge the public in darkness. A large room in the basement, of fireproof construction, is specially set apart for the respective supply companies' main fuses, meters, &c., and for the main distribution boards. From this room the main circuits are run to the various sub-distribution points, and thence the sub-circuits are taken to the lamps, which are wired in small groups, each controlled by fuses. Although the two supplies mentioned bring the middle wire of their three-wire

systems into the building, the general wiring is across the two outers, the incandescent lamps being for 200 volts. The middle wire is only used for the arc services.

The main circuits are insulated with vulcanized rubber and are run in Armorduct conduit, the rest of the wiring having been drawn into similar conduits after erection, or being in oak casing. None of the lamps in the entrances, exits, passages, &c., or in other public parts of the building, are controlled from the stage. This is an important and essential point, as fires in theatres generally occur behind the curtain. The stage switchboard is on the prompt side of the curtain and controls the lighting through 40 "Lyon's" liquid resistances, which are in fireproof rooms below the stage. The stage lighting comprises 50ft. of footlights containing 212 32-c.p. lamps of four different colours; 30ft. side battens of four colours; one 52ft. batten of four colours; and nine 40ft. battens of three colours. Portable hand battens are also provided for, these being connected, as required, to plugs in the stage of "Wingfield Bowles" patent design. Further there are twenty-four hand-fed stage arc lamps, complete with all the necessary lenses and coloured mediums, and provision for four special projectors specially made by Messrs. Siemens Brothers & Co., Ltd., for producing special lighting effects; 200 special effect plugs are provided. The whole of the installation, exclusive of arc lamps, is equivalent to 18,000

lamps of 8-c.p. The wiring has been done by Messrs. Blackburn, Starling & Co., of Nottingham and London, and this firm has made the whole of the battens, floats, distribution boards, &c., as well as carrying out the lighting of the revolving globe on the tower of the building, this comprising 500 electric lamps; the globe is 15ft. in diameter and is revolved by an electric motor housed below. The electric-light fittings have been made to the consulting engineer's designs by Messrs. Osler & Co., Benham & Froud, and McGeoch. The stage switchboard was made by Messrs. Ernest F. Moy & Co. There are 51 miles of electric cable in the building and about 120,000ft. of steel tube. As an installation, for size only there are many towns which would envy the lamp total of the Coliseum, the power required to work the electric-light installation being equal to 1,000-h.p.; whilst for completeness and detail it is probably in the way of theatres second to none.

Builders' Notes.

The Building Trade at Preston is very bad at present. Half the bricklayers and their labourers are out of work, while plasterers, painters, carpenters and joiners are little better off. The flaggers and slaters and the woodworking machinists have perhaps the least to complain about, but in no branch can the state of trade be said to be satisfactory.

Cheaper Cottages.—At Bakewell last week the Duke of Devonshire said the existing by-laws made it impossible to erect a cottage for less than £250 or £300, and this could not be let for less than £12 to £15 per annum, a figure which was quite prohibitive to the rural labourer. The by-laws made requirements which prohibited full advantage being taken of the ingenuity of architects and builders tending to cheapen the cost of erection.

A Girl Bricklayer, named Marie Roenix, who is studying architecture at Christiania, obtained permission from the authorities to assist in building some municipal offices, and, attired in blue trousers and a white smock, took her place on the scaffold with the men. As she was leaving the premises recently a bucketful of half-slaked lime was thrown over her, burning her face and hands so badly that she had to be removed to hospital.

The Birmingham Building Trades Federation—comprising sixteen trades—has been dissolved because certain sections will not withdraw their men when disputes occur. Each section will now stand by itself—that is, the labourers in any case of dispute will not have the support of the carpenters, plasterers, &c., and *vice-versa* throughout all trades. What the ultimate result will be is doubtful. Whether it will mean a reduction in wages by the Masters' Association after attacking first one and then the other of the trades in question, or whether they will only attack those that have caused such divided opinion in the building trade, remains to be seen.

12,500 Registered Plumbers.—At the annual dinner of the Plumbers' Company held last Thursday in Stationers' Hall the Master (Sheriff T. Vezey Strong) said there were now 12,500 skilled plumbers registered on the books of the Company and holding its certificates.—The committee appointed by the Conference of Health and Water Authorities, Architects and Plumbers at Birmingham in October, 1900, held a further meeting on Thursday in the Guildhall, London, Mr. W. D. Caröe (architect to the Ecclesiastical Commissioners and Warden of the Plumbers' Company) presiding. Resolutions were passed recommending for general adoption apprenticeship for plumbers on the lines of the indenture settled by the London Apprenticeship Board.

THE ARCHITECTURAL ASSOCIATION.

Some Architectural Reflections by
Mr. Raffles Davison.

A MEETING of the Architectural Association was held on Friday evening at 18, Tufton Street, Westminster, the chair being occupied by Mr. Louis Ambler. The following new by-law was passed with the object of claiming exemption from local rates: "The Association shall not make any dividend, gift, division or bonus unto or between any of its members."

Mr. Walter H. Brierley, of York, and Messrs. W. Baird and F. L. Hunt were elected members of the Association, after which the following additional donations to the Building Fund were announced:—

	£	s.	d.		£	s.	d.
J. Carmichael	50	0	0	F. E. Lloyd	1	1	0
W. Cowlin & Son	5	5	0	Dowries	1	1	0
J. W. Penfold	5	5	0	G. H. Lovegrove	1	1	0
R. F. Chisholm	5	0	0	G. H. Oadley	1	1	0
George Wragge,				L. Simmons	1	1	0
Ltd.	3	3	0	Neil C. Smith	1	1	0
Sir John Taylor	2	2	0	H. Tanner, junr.	1	1	0
C. A. Sharp	1	11	6	E. G. Theakston	1	1	0
R. W. Collier	1	1	0				

A vote of condolence with the relatives of the late Mr. Francis W. Bedford was passed.

Mr. T. Raffles Davison then read a paper on "Some Architectural Reflections."

He spoke first of influences, observing that one could hardly doubt that the monumental treatment of Mr. Gilbert Scott's cathedral for Liverpool was partly ascribable to the influence of Sedding and Mr. H. Wilson grafted on to the scholarly ability of the late Mr. Gilbert Scott. Then, turning to personality, he spoke of the delight of it, as evidenced in notable architecture, and he urged that everyone should be true to himself for why should one stir up the cold soup of the Queen Anne period if he

preferred the fiery spirit of the Spanish Renaissance? Why fit up the details of a Gothic church in the archaic simplicity of an Eastern style, if we ourselves were sympathetic to the ornate decoration of the Perpendicular period? Why adopt coupled dormers which another man had made effective, if our conscience rebelled against the costly gutter between them? Why copy the latest competition success if it went against our sympathies? Why change our style of architecture every week to suit the supposed leanings of each new assessor whose judgment seat we had to face? Why? To catch the favouring breeze that would waft us to success? To show our versatility or largeness of mind? Yet the architectural studio was not a draper's shop to fit the passing fashion or the client's whim. It was the school where one learnt to develop one's own aim by a steady light of firm belief, and it could not be illuminated by will-o'-the-wisps or shooting stars. He remembered when all gables did not have little kicked-up kneelers; when there were fewer country cottages with long sloping buttresses; when there were no gable apices like those at Scotland Yard; and when there were perhaps no modern boundary walls built up from pier to pier with inverted arches. Yet these interesting little details by Messrs. Bentley, Voysey, Norman Shaw and E. S. Prior had been clung to for salvation by many who were drowning in a sea of influence for want of the life-belt of individuality.

Some folk might construe such adaptation into catholicity of mind. If so, then we needed to make a strong stand for catholicity of temperament. The architects whose work he esteemed most had a charitable eye for the work of others, and they took the good from whatever source it came.

But the snare of catholicity was its possible degeneracy into a weakening of

sound principle and a lack of restraint. A very able architect said lately that he had been learning the art of "wiping out" all his life. But then his practice had been largely in big things. One could wipe out too freely in some things—in house design, for instance—and Mr. Davison ventured to say the wiping-out process had gone too far with some people. Restraint, too, was a question of colour as well as form. He always felt the influence of breadth in Mr. Hare's municipal buildings at Oxford, which, with all their elaborate detail and picturesque treatment, possessed that quality by reason of the blending of the grey stone slates with the stone walls.

If we made a trade of art, of course it would be our duty to supply to the order or whim of a client whatever he asked for, and if he desired a Bodleian church, or a Jacksonian college, or a Dawberian house, we would make haste to supply it, either by servile imitation on our own part, or by the employment of capable ghosts. But this surely was a wrong way to look at the art of architecture, which we would best serve by trying to put something of ourselves into the study and practice of it.

Bills of extras, prices of materials, valuations and similar matters were not forgotten by Mr. Davison, but his emphasis was not on these, but on the need of the architect being an artist first and foremost. That was the only excuse for his existence. The term "art-architect" was an absurdity. All architects were artists—at least, nearly all; perhaps 500 out of every 5,000 were, at all events. But, strange to say, whilst the man who created the beauty of a building was often ill-paid and unknown, the business-like man who posed as an architect traded on this, with most profitable results.

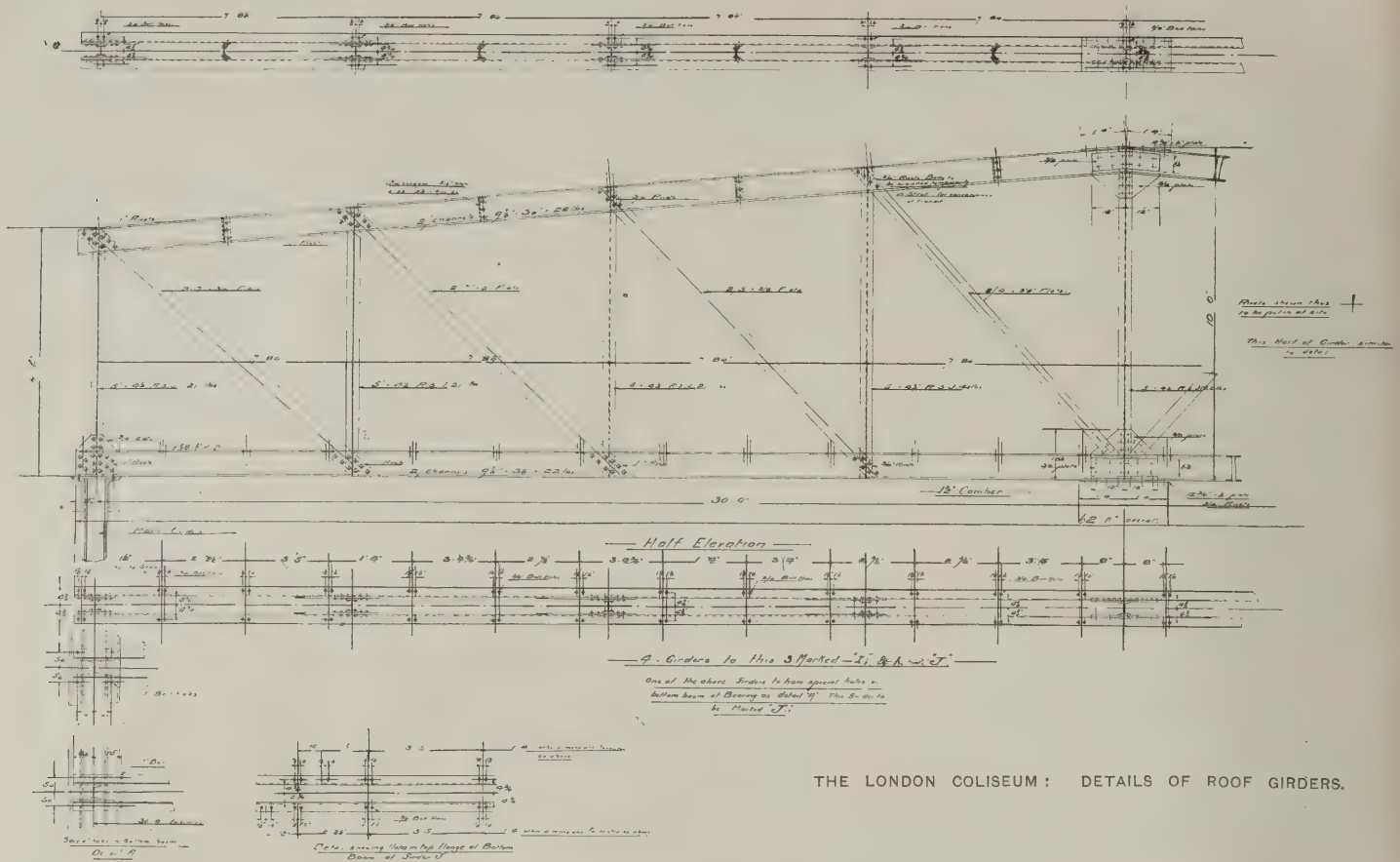
The art of beautiful design was the very crown and flower of their profession, and until this were better realized we should never do great work.

The motto of the Architectural Association said "Design with Beauty, Build with Truth." These two things had to be done together. Building with truth alone would not do, though some of the latest apostles of art would almost seem to suggest so. Truth was often a very disagreeable thing by itself. The truth alone about many of our modern street frontages would be a terrible exhibition of girders and stanchions, though it was even worse when these were clothed with the beauty of false ornament. No more difficult motto could be devised as a watchword. We were delivered over to two glorious creatures, Truth and Beauty, and any student of human nature knew which made the easier conquest. Beauty was very captivating even when her falsehood was only half concealed, whereas Truth was always a little frigid. Beauty was always luring us on into unknown paths of wonder and delight. Truth was ever arresting our steps with warning in her voice. Beauty was always kind and silver-tongued; Truth was ever reading us a lecture. Truth often seemed to hate Beauty's presence, but Beauty always pretended to think well of Truth. Truth seemed grudging and niggardly, whilst Beauty was prodigally generous. It really seemed easier to cast in our lot altogether with one or the other, but very difficult to please both together. Yet we could not afford to allow the jealousy of Truth to banish Beauty, and we had ever to be on our guard against the lurking falsehood in Beauty's heart. Who had not admired the effect of a good mass of walling in a position where it was not only perfectly useless, but horribly expensive? And could we find it in our hearts altogether to blame a really clever architect for doing such things? No, the fact was, we had to "shut the other eye" very often in architectural design.

A short discussion followed.



LONDON COLISEUM: FIGURES AND REVOLVING GLOBE AT SUMMIT OF TOWER.



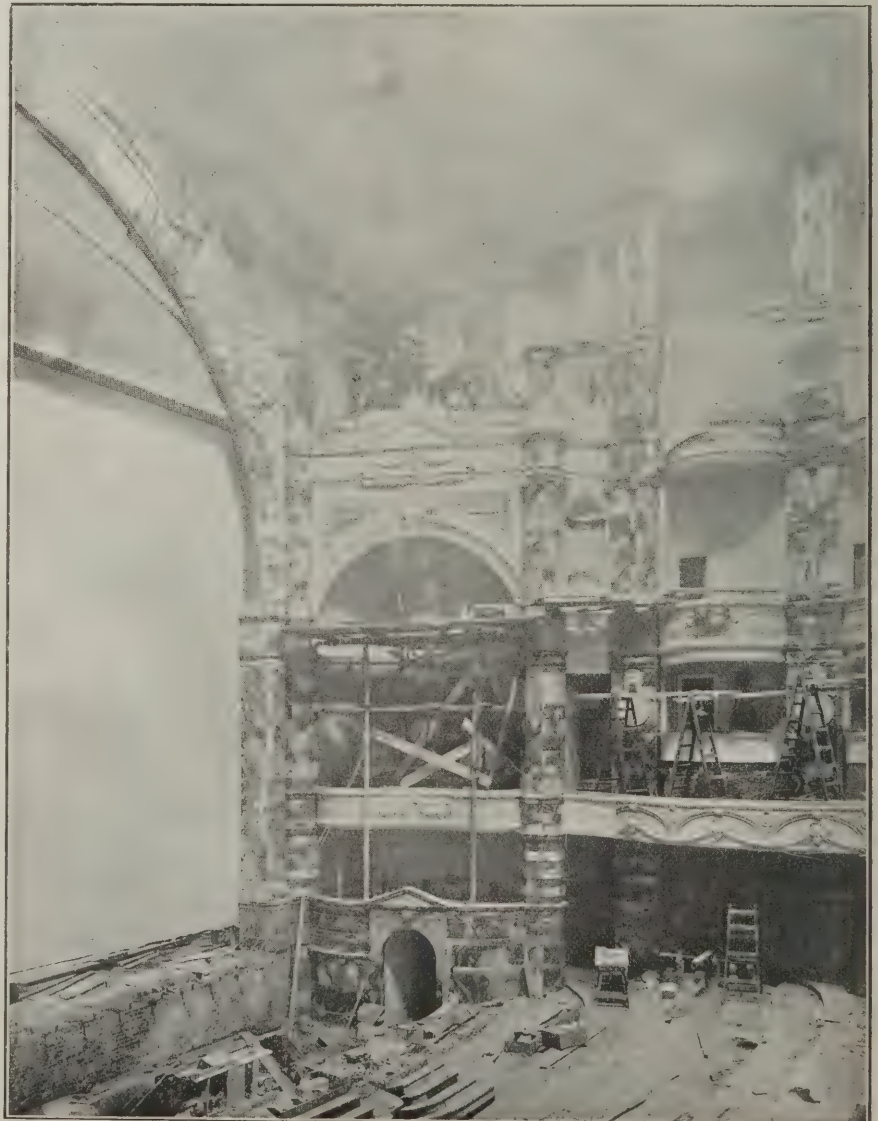
THE LONDON COLISEUM: DETAILS OF ROOF GIRDERS.

ARCHITECTURE IN EASTERN EUROPE.

A LECTURE with this title was delivered by Mr. E. M. Gibbs before the Sheffield Society of Architects and Surveyors last Thursday. It was illustrated by a number of views of buildings, obtained on an eighteen days' cruise in the Mediterranean, with a few odd days on shore, visiting Taormina, Constantinople, Smyrna, Ephesus, Athens, Corinth, Mycenæ and Tiryns. In referring to Corinth, Mr. Gibbs mentioned the modern canal across the isthmus, a great engineering work, $3\frac{1}{2}$ miles long, with water 10ft. wide and 26ft. deep. At Athens the stadium had recently been restored by a Grecian merchant; it had white marble seats on three sides raised in sixty tiers, so as to hold 50,000 people; and being formed out of a natural valley, it suggested to Mr. Gibbs that if the Sheffield Water Department ever did away with one of their large dams at Crookesmoor, there would be an opportunity of forming an exceptional place for sports and great meetings. Views of modern buildings in Athens showed how excellently the architects worked in the ancient style. At Ephesus the remains of the Temple of Diana (discovered by Mr. Wood, an English architect, 22ft. below the surface) were now in a great hollow and difficult of access because of water; the best of the work was to be seen in the British Museum; but the excavations of the city were being rapidly proceeded with, and any traveller to the East should visit Ephesus.

Law Cases.

Action against an Architect for Alleged Negligence.—Judgment in the case of *Hodgson v. Waugh*, reported in our issue for last week, will be given by the Lord Chief Justice on Monday next, December 19th. The case is in reference to certain alterations made at Hexton Manor, Hertfordshire.



Correspondence.

Exeter's Old Guildhall.

To the Editor of THE BUILDERS' JOURNAL.

EXETER.

SIR,—Permit me to distinctly contradict the statement recently made in your columns that when, on behalf of the Society for the Protection of Ancient Buildings, Mr. Thackeray Turner took the Elizabethan façade of Exeter Guildhall "in hand, it was black with soot, except the portions where the surface of the stone had recently fallen off, and now it is stone colour." I am in a position to state that only an infinitesimal quantity of stone has fallen during the last forty years. Moreover, Exeter is a provincial city possessing practically no manufactories; hence the buildings have no sooty deposits. The Beer stone of which the Guildhall is mainly built had toned down to an exquisite grey tint, and was the delight of all who saw it. Upon an ill-starred morn Mr. Thackeray Turner arrived with his whitewash pail, bedaubed the whole frontage with his ungodly concoction, and that which had been the pride and the delight of all comers became the laughing-stock it has been ever since.—Yours truly,

HARRY HEMS.

To the Editor of THE BUILDERS' JOURNAL.

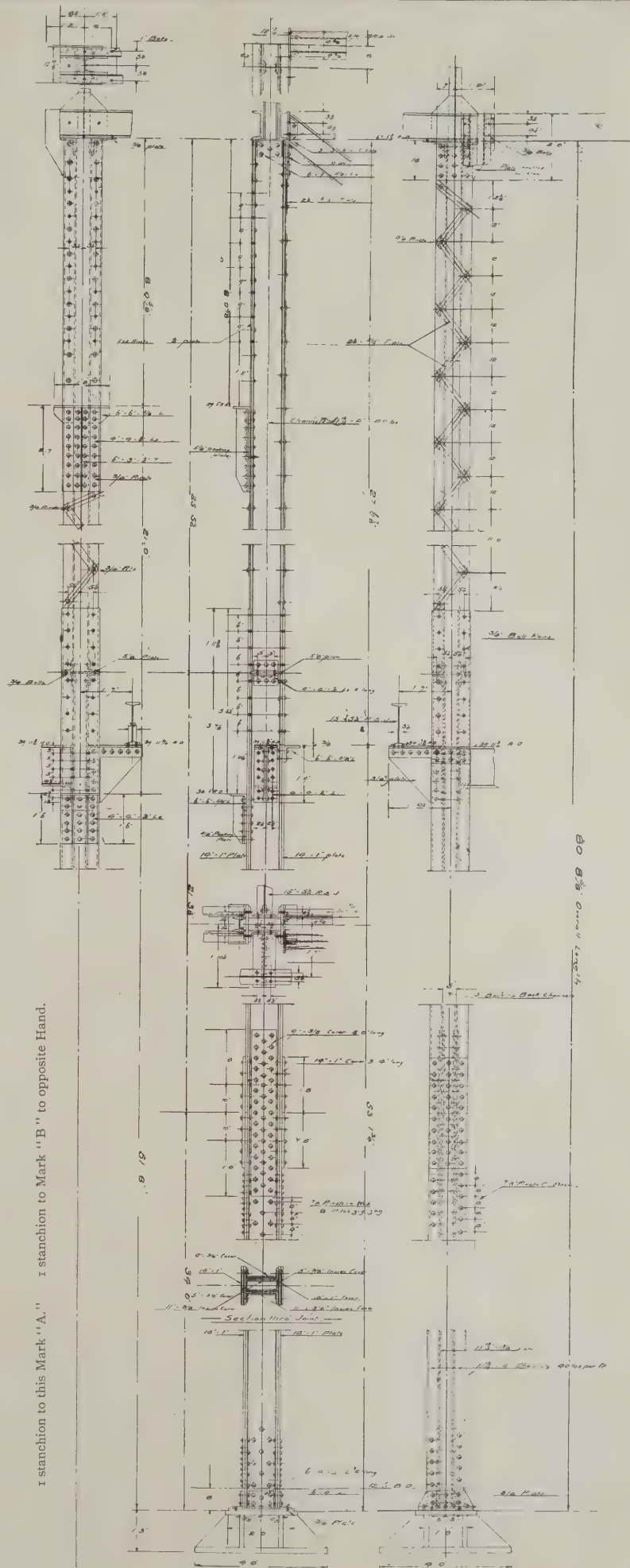
LONDON, W.C.

SIR,—I am sorry that Mr. Harry Hems should give a flat contradiction to my statement that Exeter Guildhall was black with soot before it was repaired. I read this statement to my committee at their recent meeting, and those present, who had seen the building, were of opinion that I had been accurate. I think Mr. Hems takes too rosy a view of his city with regard to smoke. Undoubtedly it is not a manufacturing city, any more than, say, Canterbury or Oxford, and yet in both these cities buildings are black with smoke, and so they are at Exeter, according to my eyes. However, even if Mr. Hems were right and the building in question was beautiful before we touched it, and ugly now, the fact remains that we rendered it secure when it was in a most dangerous structural condition, and that, with the exception of the introduction of one or two new columns in the place of columns which had almost entirely perished, we left the exterior form of the building exactly as we found it. But we did limewash it, and this limewash, although put on some four years ago, has so far remained intact and therefore checked the decay of the stone. Mr. Hems may be annoyed that my Society did not take advantage of the advice which he gave. It had however previously tried his suggestion, and decided that it was not a success, whereas we had found that limewashing was a success.—Yours truly,

THACKERAY TURNER,

Secretary of the Society for the
Protection of Ancient Buildings.

At Drury Lane Theatre the wooden balcony, gallery and ceilings have been replaced by steel, concrete and plaster. New exits have been made from the gallery and four stone staircases erected in place of the two old spiral ones. The proscenium opening has also been altered, additional columns being introduced on either side. The stage portion of the theatre has been entirely rebuilt, a stage of steel with teak boarding being introduced, new flies and grid, and the floor under the stage formed with concrete. All scenery will be rendered non-inflammable. The alterations have been made under the direction of Mr. Philip E. Pilditch, consulting architect to the Bedford estate, of which Drury Lane is a part.



1 stanchion to Mark "B" to opposite Hand.

1 stanchion to this Mark "A."

THE LONDON COLISEUM: DETAILS OF STANCHION AT BACK OF STAGE.

THE TIMBER TRADE.

The London Market in November.

NOVEMBER has been characterized by a reduction in the volume of trade. The importation has been so small as materially to affect the statistical position of the market for the better in comparison with the end of October. This has partly been in consequence of the rapid closing of the more northern European ports, notably Cronstadt, by a cold autumn; but, apart from this, there has been no pressure either to consign or to sell below price to this market. If December works no change in this respect—and the importation in December, 1903, was a heavy one—Messrs. Churchill & Son, the well-known timber brokers, state London will winter a smaller stock than for many years past. The other side of the account has, however, to be looked at also, and the further 1,000 standards which have been knocked off the dock deliveries in the month in comparison with the decreasing deliveries of the year before is no very good augury for our winter's trade. One other point is of importance in forecasting the course of markets, and that is the fact that shippers have not had a good year in 1904, and will naturally strive hard for something better than present prices for 1905. In addition, the political and financial position in Russia, of which it is difficult to foresee the results, may hamper shipments from that country in 1905, while Canadian shippers will be very independent of the European markets owing to the great and increasing prosperity of their American consumers.

Messrs. Denny, Mott & Dickson, Ltd., report that the general tone of the timber trade during November has been one of increasing assurance that both prices and imports have soundly adjusted themselves to the restricted trade which has marked all this year, and therefore that the all-round improvement which follows a widened outlet may fairly be counted on as the next phase of the market, although such widening out of the demand for consumption may yet be far off.

The abstract of stock, consumption, &c., for the month of November, published by Messrs. Foy, Morgan & Co., is as follows:—

S.C. Dks. and M. Dks.	Deals (Fir).	Battens (Fir).	Pine.	Spruce.	Pitch-pine Deals.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.
Public dock stock - - - - -	1,912,297	3,671,507	1,180,934	1,125,392	67,587
Monthly public dock stock consumption - -	248,474	512,575	93,710	118,698	8,224
Over-side stock - - - - -	675,849	1,394,041	254,891	324,859	—
Over-side consumption (estimated of dock):—					
78 per cent. Sawn - - - - -	193,810	399,762	73,094	92,584	—
51 " Planed - - - - -					
Duration of supply at same rate of consumption - - - - -	5'85 months.	5'55 months.	8'61 months.	6'85 months.	8'22 months.

S.C. Dks. and M. Dks.	Deals and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
	Pieces.	Pieces.	Pieces.	Loads.
Public dock stock - - - - -	7,957,717	4,591,656	7,286,733	32,000
Monthly public dock stock consumption - -	981,621	571,542	1,200,687	2,782
Over-side stock - - - - -	2,647,640	1,554,594	348,199	—
Over-side consumption (estimated of dock):—				
78 per cent. Sawn - - - - -	759,250	445,803	612,350	—
51 " Planed - - - - -				
Duration of supply at same rate of consumption - - - - -	6'09 months.	6'04 months.	4'21 months.	11'50 months.

Dock Stock in November.

Summarizing this, we find the stock of wood in the public docks on November 30th was:—

Foreign deals and ends - - -	2,292,000
Do. battens - - - - -	3,360,000
Do. boards, rough - - - -	4,591,000
Do. do. prepared - - - - -	7,287,000
Colonial pine, deals and battens - -	1,182,000
Do. spruce do. do. - - -	1,126,000

Totalling 19,838,000 pieces as against 23,391,000 pieces in November, 1903, and 23,458,000 pieces in November, 1902.

In other kinds the stock was as follows:—

Foreign wainscot logs - - -	307 pieces.
Do. oak timber - - - - -	884 loads.
Do. fir timber - - - - -	1,324 do.

Foreign Oregon pine, &c., spars and masts - - - - -	5,795 loads.
Colonial oak timber - - - -	1,557 do.
Do. birch timber and planks -	2,943 do.
Do. elm and ash timber - - -	1,097 do.
Do. yellow pine - - - - -	622 do.
Do. red pine - - - - -	255 do.
United States pitch-pine timber -	23,176 do.
Do. do. deals - - - - -	68,000 pieces.
East India teak - - - - -	8,884 loads.

Dock Deliveries for Eleven Months.

The deliveries for the first eleven months at the public docks have been:—

	Pieces.
Foreign deals and ends - - -	3,163,000
Do. battens - - - - -	5,729,000
Do. boards, rough - - - -	5,383,000
Do. do. prepared - - - - -	14,541,000
Colonial pines, deals and battens -	1,019,000
Do. spruce do. do. - - -	1,452,000

A total of 31,287,000 pieces as against 33,524,000 in 1903 and 35,856,000 in 1902, or, stated in cubical contents:—

	1904.	1903.	1902.
Sawn woods - 133,081 P.s.h.	142,022	155,891	
Prepared boards 46,215 P.s.h.	49,099	53,583	
Timber - 63,888 loads	71,115	76,210	

Dock Deliveries for November.

The deliveries for November were:—

	Pieces.
Foreign deals and ends - - -	288,000
Do. battens - - - - -	484,000
Do. boards, rough - - - -	568,000
Do. do. prepared - - - - -	1,144,000
Colonial pines, deals and battens -	190,000
Do. spruce do. do. - - -	121,000

A total of 2,695,000 pieces as against 2,870,000 in November, 1903, and 3,298,000 in November, 1902, or, in cubical contents:—

	Nov. 1904.	Nov. 1903.	Nov. 1902.
Sawn wood - 11,711 P.s.h.	12,501	13,634	
Prepared boards 3,720 do.	3,950	4,752	
Timber - 4,678 do.	6,129	8,996	

Soft Woods.

Messrs. Churchill & Sim state that there has been almost a cessation of deal shipments from Sweden to London during November. About half the quantity of battens have arrived which were sent here in November, 1903, and there is a reduction of some 200,000 prepared boards as compared with the same month last year. Prices have at last shown some little firmness, but not anything like what would be warranted by the figures of the stock and of the importation alone. The want of demand has been all-pervading and has prevented anything more than a tendency towards improvement.

much competition from other sources prices have shown a gradual improvement, buyers being conscious that the stocks are none too heavy for the requirements of an ordinary winter demand.

From Finland the arrivals were small, but the total importation of Finnish battens for the year have been normal, and this market has specially felt the want of speculative building demand. Prices in November have been disappointing, in particular for the poorer class of battens, which usually realize so closely up to the values of the best stocks.

The importation of fir timber from Prussia in November has been larger than for some time past. It has been specially ordered for contract work, and has not greatly affected the dock stock here. Market prices remain unchanged.

The Canadian pine deal market in London is still on a very restricted basis both of supply and demand. Prices have been firmer in tendency during November, not from any increase of business but from a growing knowledge of the high rates which the St. Lawrence exporters must pay to the forest owners for their next season's supplies if they are to secure any portion of them. For spruce in the same way the supply has again been small, and the cost ahead will not allow our markets to touch them at present levels. There has been no change here, however, in November, this market having been kept down to previous prices by competing shipments of whitewood from Riga at quite low rates. Whitewood, however, is likely soon to be firmer all round, the tendency growing for Riga and Galatz prices to be dragged up in sympathy with spruce rather than the reverse process. Sawn pitch-pine timber has felt the want of demand in London during November, partly attributable to frosty weather and a consequent inability to get logs out of the ponds at the docks. Prices have drooped again in consequence, and are perhaps some 3s. per load lower than the October rates. The stock remains quite normal, and the least improvement in the consumption would be rapidly responded to. There has been a very small importation of deals in November, but again the demand has been wanting, and prices have fallen off. Prices for shipment remain rather firm.

Hardwoods.

Mahogany.—Messrs. C. Leary & Co. report that the supplies continue to be moderate and prices generally are firm with a steady demand.

American Whitewood.—There is a fair enquiry for first quality lumber, but prices tend to weaken on account of the heavy quantities offering; lower grades have not yet recovered from past excessive supplies: prices are from 2s. 3d. to 3s. 6d. per cub. ft. for first quality, 1s. 9d. to 2s. for clear saps, 1s. 6d. to 1s. 9d. for medium, 1s. to 1s. 3d. for Culls. There is no demand for logs.

Teak.—Messrs. Denny, Mott & Dickson Ltd., report that the consumption of teak continues to be very moderate.

Odessa Oak.—The liking for this wood continues to develop, and there is a widening demand for flooring and other conversions, whilst the logs are being placed on a scale with which the present limited freight opportunities cannot cope. Good shipments, however, can be counted on in the early part of next year; and business will meantime run in the groove of contracts for spring shipment. Shippers have delivered a reliably first-class wood at a moderate price; and the result of this sound policy is that their article has established a high reputation in a short time, and should win a widening and permanent outlet so long as they maintain the reputation of their shipments.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Descriptions and Lantern Slides of the English Cathedrals.

EDINBURGH.—SUBSCRIBER writes: "Which book or books give concise descriptions of the English cathedrals suitable for explanation with lantern slides of the buildings?"

Mr. Bond's book upon English cathedrals will probably best meet the case, while Messrs. J. H. Steward & Son, 457, West Strand, W.C., have a series of lantern slides illustrating our cathedrals which they let out on hire. M.

Damp Walls.

RADLETT.—SUBSCRIBER writes: "A house here shows signs on the inner faces of first-floor walls of considerable moisture at this time of the year. The walls are distempered and the moisture covers the whole surface. I attribute this to condensation, but recently garments hanging in the room were found so damp that they gave off steam when placed before the fire. The garments were in daily use. One room faces south-east and one north-west. Trees are rather near the house. The walls are gin, rough-cast. In an adjacent house similar rooms show no traces of damp, but they are papered. Is the cold surface of the distempered walls the cause of the moisture, and if so why should garments be damp?"

The moisture to which you refer is due to condensation, and I have little doubt it makes its appearance upon the break-up of a frost. It has its origin in exactly the same way as dew is formed. In the case of papered walls the condensation is not nearly so great, and the small amount which does take place is probably absorbed by the paper. I can only suggest that you should rub the walls with a piece of dry flannel, in the way in which I have known old-fashioned house-keepers to take advantage of the phenomenon as a good opportunity for cleaning painted walls. F. S. I.

Line Drawings for Reproduction.

CARDIFF.—PEN NOT BRUSH writes: "Which is the best paper to use for line perspective drawings intended for reproduction? I have been variously advised to use Whatman's hot pressed, Bristol board, and a host of others."

A lot of nonsense is talked about the papers to use for drawings for the press, some artists advocating anything that happens to be handy, while others affect the utmost scrupulousness in the choice of papers. What you want to do is to avoid using a paper which has a rough surface, because drawings on such paper are apt to produce broken lines: for that reason a smooth paper is the best, and Bristol board is chiefly used because it has an excellent surface and does not tear up with the pen. A particular point to bear in mind is that gradation in tone is to be given by thinness of line, not by thinness of ink. When reproduced by the line process, all lines have the same value, and they are either on the plate or they are not—which means that if you draw a faint line which looks very effective on the original it may either be too faint to reproduce—in which case, of course, it will be lost—or just strong enough to affect the plate, and then it will come up black. Hence the necessity for using ink uniformly black.

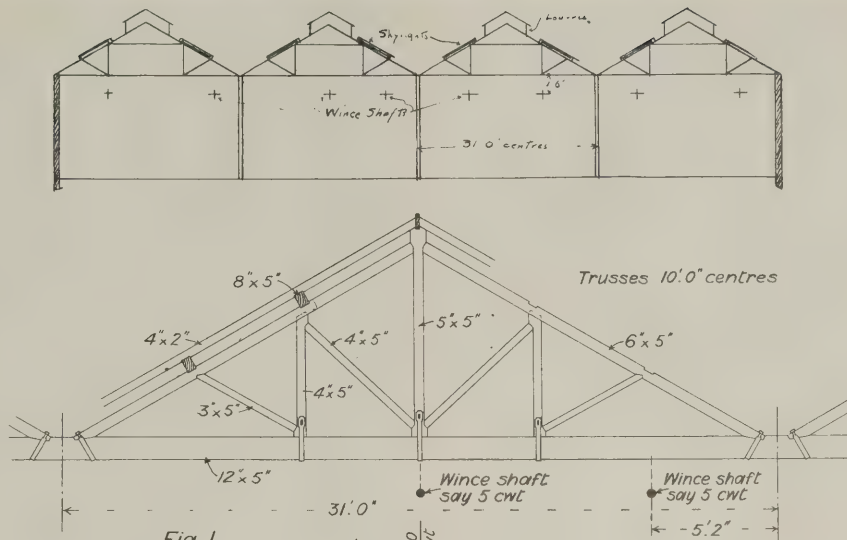


Fig. 1

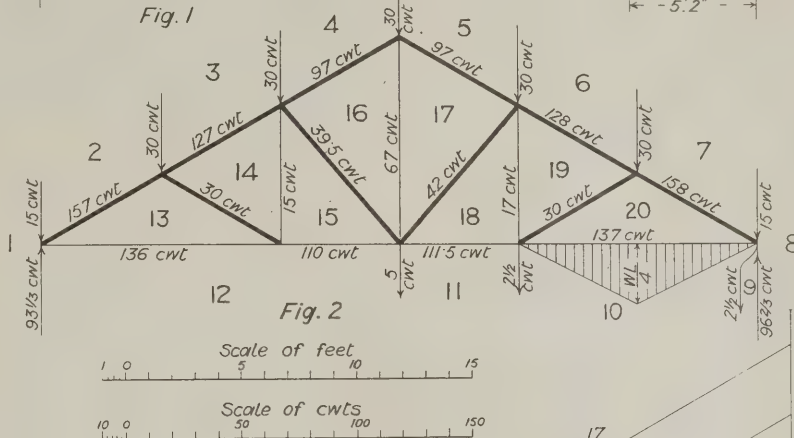


Fig. 2

Queen-Post Trusses over a Bleach Croft.

MANCHESTER.—A. C. writes: "The accompanying sketch shows a section of a wood queen-post in four bays over a bleach croft. The tie-beam to the principal has to carry the wince shafting to the machines. The shafting is of 2½ ins. diameter, running about 130 revolutions per minute, and has to be carried quite steadily. The cloth which runs over the winces would be wet, in rope form, but about 54 ins. when opened out. What should be the scantling of the beam? Would it be necessary to put in a fitch plate? Should the other members of the truss be strengthened also; if so, how much? Also, the roof being subject to much steam and alternate hot and cold air-currents, what kind of wood would you suggest for same? Iron is out of the question owing to the dropping of rusty condensed water. Would it be improved by boarding and felting the portion of the roof between gutters and skylights and under louvres? Would patent glazing be better than ordinary wood framing for the skylights, which would be 60 ft. long by 6 ft. deep on each side of the roofs?"

A queen truss is a bad form for hanging machinery and shafting, owing to the pull of the belts causing cross strains in the tie-beam, the centre part of the truss being unbraced. A better form of truss for the purpose would be that shown by the illustration above. Seasoned oak would probably be the best material, but varnished pitch-pine might be sufficiently impervious to moisture. The iron straps and bolt-heads would have to be well protected from rusting; they should be painted with the carbonizing coating made by the Goheen Manufacturing Co., or Acheson graphitic paint made by Messrs. Crosier, Stephens & Co., of Newcastle-on-Tyne. Patent glazing would undoubtedly be better for the skylight than ordinary wood framing and putty. Boarding and

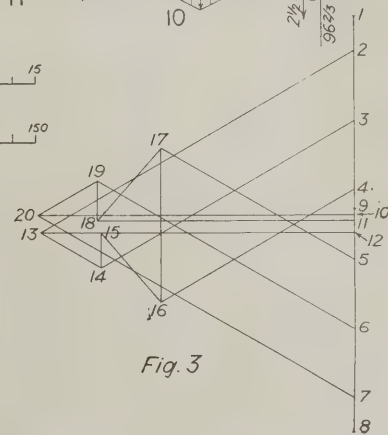


Fig. 3

felting under the slates would prevent some condensation of steam on the underside of the roof in cold weather. It will be seen by Fig. 1 that the truss is designed of uniform thickness throughout; it is possible that ½ in. less in thickness might be sufficient, but no mention is made of the amount of the loads to be carried, and it is well to be on the safe side. The frame diagram, Fig. 2, shows the loads allowed for and the reciprocal diagram, Fig. 3, shows the stresses. The load on the beam gives a cross strain, and therefore a bending moment, as shown on Fig. 2, in addition to the direct stress, the combined

effect being given by the formula $\frac{W}{A} \pm \frac{M}{Z}$, where W =direct stress in cwts., A =nett area in sq. ins., M =bending moment in inch-cwts., Z =modulus of section in inch-units. Then $\frac{W}{A} \pm \frac{M}{Z} = \frac{137}{50} \pm \frac{154^8}{83.3} = 4.6$ cwts. per sq. in. the underside of tie-beam and .88 cwts. per sq. in. on the top side, which would be within safe limits. HENRY ADAMS.

Hip Roof.

W. S. M. writes: "I send a sketch of a lean-to roof (not reproduced). Can the hip be carried out?"

A hip cannot be made as shown at the end of a lean-to roof. The roof can be brought down on the slope, but does not

look well. We have occasionally seen a hipped portion constructed independently with the exposed portion of the lean-to roofed vertically.

R.I.B.A.

Pass List for November Examinations.

THE pass list for the November examinations of the Royal Institute of British Architects is as follows:—

The Preliminary Examination,

qualifying for Probationership, was held simultaneously in London and the provinces on November 8th and 9th. 194 candidates were admitted, and of these 58 were exempted from sitting. The remaining 136 were examined with the following results:—

	Number Examined.	Passed.	Relegated.
London - - -	55	41	14
Birmingham - - -	9	6	3
Bristol - - -	7	4	3
Cardiff - - -	8	6	2
Leeds - - -	15	10	5
Manchester - - -	25	19	6
Newcastle - - -	17	14	3
	136	100	36

The successful candidates, and those exempted, making a total of 158 newly-registered Probationers, are:—

A. J. T. Abel (Fulham) T. C. Hughes (Birkenhead)
J. E. Adamson (Bradford) G. B. Jackson (Newcastle-under-Lyme)
A. G. W. Allen (Leeds) J. McN. Jeffery (Pimlico)
J. C. Anderson (Lee) R. Jaques (Knaresborough)
F. Bacon, junr. (Battersea) J. R. Johnstone (Ayr)
F. A. Baldwin (East Acton) G. B. Kaufman (Sutton)
E. H. Ball (Dudley) S. V. Kendall (Croydon)
C. D. Barber (Romford) P. K. Kipps (London, S.E.)
T. C. Barker (Scarborough) S. M. Kirkman (Croydon)
V. S. Barnes (Carmarthen) F. L. M. Kirkman (Croydon)
H. Battiscombe (St. Mary Cray) S. Lambbrick (Burton-on-Trent)
W. Beswick (Chester) T. S. Linton (London)
B. W. Billinge (Farnham) F. A. Llewellyn (Richmond)
A. G. Blackford (Ealing) H. S. Lockhead (London)
C. V. H. C. Blackwall (Derby) H. J. Luck (Leighton Buzzard)
B. J. Boothroyd (Brockley) C. B. Lyne (Cheltenham)
J. E. Bowness (London) G. N. Lynn (Newark-on-Trent)
H. Bradley (Blackpool) R. J. Macdonald (Inverness)
H. E. Bunce (Clapton) A. J. McLean (Brighton)
W. H. Burgum (Birmingham) C. S. Madeley (Birmingham)
F. M. Burr (Hornsey Rise) T. C. Mannoch (London)
E. G. Catchpole (Ipswich) G. F. Marshall (Leek)
R. A. Chadwick (Blackpool) C. J. F. Martindale (Carlisle)
P. T. Chapman (Bolton) H. E. Matthews (Yeovil)
P. J. Clarke (Heswall) S. W. Millburn (Sunderland)
O. Coghlan (Cheltenham) W. Milburn (Bishop Auckland)
E. S. Coldwell (London) C. J. Mole (Plymouth)
F. W. Commis (Exeter) W. Moor (Morecambe)
C. Cooke (Southend) E. J. E. Moore (Newport, Mon.)
G. V. Cooke (Eastbourne) C. O. Moreton (Birmingham)
C. J. M. Cowdell (Leicester) W. E. Müllerhausen (Forest Gate)
J. Crabtree (Blackpool) W. W. Neat (Brynawr)
J. D. Crawford (Bishop Auckland) D. E. Oram (Croydon)
C. E. S. Davies (Llanfair-echan) W. A. Orton (Leeds)
C. R. Davy (Maidenhead) W. Park (London, W.)
A. H. L. Daw (Cardiff) G. E. Pearse (Johannesburg)
H. A. Dickman (Nottingham) A. T. Phillips (Rickmansworth)
G. Duncan (Rochdale) H. G. Phillips (Richmond)
S. Edwards (Barnstable) A. D. Philpott (Dover)
W. H. Elsdon (Dalston) R. S. Ponting (Bristol)
W. S. A. Emden (London) S. G. Reilly (Bayswater)
C. G. Evans (Neath) W. G. Ralph (Carlisle)
F. Fernyhough (Didsbury) L. A. Reynolds (Hull)
D. H. Fish (Chigwell School) J. B. Richardson (Shotley Bridge)
H. S. Fleming (Bingley) P. Richardson (Thornton Heath)
G. H. Foggiitt (Leeds) S. Riches (Balham)
O. Gaunt (Camden Town) F. A. Roberts (Mold)
B. S. W. Gilbertson (West Hartlepool) S. Robertson (Dumbarton)
K. Glover (Wylam) F. J. Robinson (Bentley)
W. Goodchild (Ipswich) G. C. Robson (Brixton)
G. D. Hake (London) H. E. Ross (Nottingham)
H. W. Hallas (Huddersfield) J. A. Ross (Edinburgh)
J. C. Hardy (Nottingham) G. C. Rubie (Dover)
S. Harrison (Middlesbrough) H. J. Ruddle (Watford)
A. P. Hartnell (Bristol) A. Rylatt (Hull)
J. S. Harvey (London) W. H. Sagar (Blackpool)
W. H. Hatchard-Smith (Charlwood, Epsom) S. G. Scales (Westcliff)
C. D. Hawley (Ipswich) S. D. Scammell (Bristol)
H. C. Haworth (Chorley) S. M. P. Sheppard (Camberley)
J. A. S. Haworth (Huddersfield) A. S. Slater (Gateshead)
I. Henderson (South Shields) T. Spencer (Putney)
L. K. Hett (Rugby) G. T. J. Stemp (Newport, Mon.)
A. Hewetson (Leeds)
H. R. Holland (Southport)
P. E. Holland (Bexley)
J. H. Hcod (London, N.)
F. Howard (Ashton-under-Lyne)

W. C. Steljes (London) H. A. Welch (Crofton Park)
J. J. Stout (Stockton-on-Teess) W. B. Wheatley (Hull)
R. V. Sturgeon (Manchester) W. G. Whincop (London)
F. Suddards (Bradford) A. E. M. Whitehouse (Stockport)
M. C. Sunter (Cnortlton-cum-Hardy) H. Whittaker (Acorington)
T. S. Tait (Paisley) H. S. Whittingham (London)
J. H. Taylore (Whitley Bay) H. G. Wicks (Bournville)
F. D. Thomson (Dundee) J. P. Williams (Llangollen)
A. I. Turner (Forest Gate) F. C. Wilson (Birmingham)
A. Walmsley (Haslingden) N. F. S. Winter (Blackpool)
R. A. Walter (Harringay) L. S. Wood (London)
S. K. Watkins (Rotherham) W. E. Woodin (Anerley)
C. H. Wright (Aylesbury)

The Intermediate Examination,

qualifying for Studentship, was held simultaneously in London, Bristol, Leeds and Manchester on November 8th, 9th, 10th and 11th, with the following results:—

	Number examined.	Passed.	Relegated.
London - - -	90	44	46
Bristol - - -	11	5	6
Leeds - - -	9	8	1
Manchester - - -	11	5	6
	121	62	59

The passed candidates (in order of merit) are as follows:—

G. Nott (Leicester) J. P. Firth (Wakefield)
W. Harvey (Ashford) B. W. Fitch-Jones (Bexhill)
P. M. Fraser (London) H. French (Hull)
H. L. Samson (Balham) E. H. Gandy (Canterbury)
S. J. Webber (Maidenhead) J. H. Gask (Stamford Hill)
S. S. Waghorn (London, N.) J. H. Goodchild (Finchley)
L. S. Wood (London, W.C.) G. H. B. Gould (Ipswich)
P. Dalton (Birkdale) J. H. Hargreaves (Fulham)
E. L. Wren (Leicester) J. A. Healey (London)
H. A. Beeston (Dover) F. B. Hooper (Manchester)
J. S. Cable (Brixton) W. Jackson (Hitchin)
A. G. Lynham (Exeter) W. Kerr (Putney)
C. H. Potter (Matlock Bridge) H. G. Lay (Wellingborough)
F. G. Oliver (Berwick) A. S. W. Mackay (Barking)
A. D. Aitken (Airdrie) M. R. Martin (Chiswick)
R. H. Blackburn (Bradford) A. M. Millwood (Barnes)
H. Blackadder (Broughby Ferry, N.B.) G. E. H. Newbold (Gainsborough)
W. P. Schofield (Leeds) G. W. Page (Bolton)
A. E. Bewick (Swindon) J. A. Pirie (Highbury)
G. H. Parry (Warrington) H. A. Porter (Gravesend)
W. L. Mellor (Halifax) A. Rigby (Manchester)
D. W. Ditchburn (Leytonstone) H. E. Seccombe (London)
R. G. Roberts (Stafford) J. C. Slaughter (Reading)
L. S. Fifoot (Penarth) A. F. Smythe (Plymouth)
F. N. Bamford (London) B. H. Sutton (Basilton)
T. S. Attlee (Putney) W. I. Travers (Kensington)
F. L. Atwell (Plumstead) G. M. Trench (Honor Oak)
F. H. Bulmer (Balham) R. J. Tyndall (Maida Vale)
T. H. O. Collings (Hove) F. A. Walker (Hampstead)
W. F. Dickinson (London) J. B. Wills (Bristol)
W. B. Wyllye (London)
S. A. S. Yeo (Exeter)

The Final and Special Examinations,

qualifying for candidature as Associate R.I.B.A., were held in London on November 25th to December 2nd. Seventy-three candidates were examined and the following thirty-three passed, the others being relegated to their studies:—

T. F. Amery (Chelsea) D. B. Jenkinson (Rotherham)
D. Anderson (Hampstead) G. A. Johnson (Croydon)
E. G. G. Bax (Catford) J. Miller (Sheffield)
W. S. Beaumont (Manchester) C. Nicholas (Tooting)
M. S. Briggs (Otley) H. L. North (Llanfair-echan)
J. S. Brocklesby (London) C. T. Palmer (London)
J. T. W. Brooke (Bowdon) C. Paterson (Bowdon)
C. F. Callow (St. Leonard's) A. R. Powys (Grantham)
C. P. Carter (Mansfield) E. Quiggin (Liverpool)
G. R. Ellis (Manchester) G. S. Salomons (Manchester)
J. A. Fletcher (Leicester) H. R. G. S. Smallman (Wimbledon Common)
H. C. Freed (East Molesey) N. C. Smith (Moffat, N.B.)
W. T. Freeman (Halifax) E. G. W. Souster (Northampton)
C. L. Gill (London, N.W.) C. J. Thompson (London)
H. H. Golding (Woolwich) J. N. R. Vining (London)
P. A. Hinchliffe (Barnsley)
A. B. Horrocks (London)
A. B. Hubback (Selangor, Malaya)

The following table shows the number of failures in each subject of the Final:—

I. Design - - -	28
II. Mouldings, &c. - - -	34
III. Materials - - -	18
IV. Sanitation - - -	14
V. Specifications - - -	11
VI. Construction: Foundations, Walls, &c. - - -	19
VII. Do. Iron and Steel, &c. - - -	27

The Ashpitel Prize

has been awarded to Mr. C. Lovett Gill, he having most highly distinguished himself in the Final Examinations this year.

At the Window-Blind Factory of Mr. E. J. Smith, 45, Grosvenor Park, Camberwell, S.E., new machinery for various processes connected with the manufacture of Venetian and other blinds has just been installed.



THE LATE MR. FRANCIS W. BEDFORD.

IN our last issue we announced the death of Mr. Francis W. Bedford. We are now able to give some further particulars of his career, together with a portrait. He was only thirty-eight, having been born in 1866. He was educated at Amersham Hall School and began his career as a pupil of Mr. W. H. Thorp, of Leeds. At the completion of his articles he went to London, entering the office of Messrs. Ernest George & Peto. Here he remained for several years and gained excellent experience for his future work. His student days were successful, and after winning prizes in 1885-6 offered by the Leeds and Yorks Architectural Society and his art school, he obtained in 1890 the Ashpitel Prize of the Royal Institute of British Architects, and in 1891 followed up this success by gaining the Owen Jones Studentship. The work which he did in Italy and Spain thereafter was most admirable, and several of his sketches adorned the walls of the Academy on his return. In fact, it is as an exhibitor at the Academy that his fame is best established, hardly a year passing without some, or at any rate one, of his works being hung. Not only has the Architectural Room contained his perspectives, but many water-colour sketches have also been accepted, an honour vouchsafed to few among architects. Commencing practice in Leeds about twelve years ago, he built a series of so-called "country houses," though most of them were very near Leeds, and it is perhaps in this branch of design that he always appeared at his best. In this earlier work the influence of Mr. Ernest George is very apparent, and in such houses as "Arncliffe" at Headingley his own taste is not so evident as at "Braham," the beautiful home near Perth of Mr. Rufus Pullar. Into this building he put his maturing thought and his best endeavours, and the result is undeniably successful. A studios care for colour and detail and a loving attention to every feature of the design marks him out as a true architect. Among other houses of this period may be mentioned "Dalguse" at Harrogate, "Weetwood Croft" near Leeds, and "Redhill" at Headingley: all very different in composition and yet all essentially English, and exhibiting a very considerable knowledge of British homes of long ago, gleaned from studies with sketchbook and pencil. In two houses in North Hill Road, Headingley, and to a less extent at "Braham," sympathy is shown with "L'Art Nouveau"; and though these houses have been christened "dolls-houses" by the malicious, they are essentially "sane," thereby differing from the work of the high-art section of architects. Mr. Bedford's partnership with Mr. Sydney



FISH MARKET AT BLOIS, FRANCE. M. RENOU, MUNICIPAL ARCHITECT.

Kitson, M.A., about the middle of his career, introduced him to work other than domestic, and happily enabled him to make his refining influence evident in the city of Leeds. Soon after the partnership was formed, several banks were designed by the firm, those at Thirsk and in Hunslet being perhaps the most worthy of note. From 1899 to 1902 was perhaps the most important period of the firm's existence. Three competitions were won in rapid succession, and even after this the tide did not turn. The first building of the three was a large branch library and police-station erected by the Corporation of Leeds in Dewsbury Road; next the Leeds School of Art, where (despite the fact that a scarcity of funds left little field for elaborate design) an excellent treatment of a plain exterior may be seen, while the grateful satisfaction of the critical tenants is the best testimonial to its interior fitness; thirdly, the Leeds Public Dispensary. In the carefully considered detail and excellent planning of their public buildings the work of Messrs. Bedford & Kitson may be studied with as much advantage as in their houses. But another chance came to them before this public work was completed, and on the Gledhow estate near Leeds four houses of some size testify to the versatile talents of their designers. Of these, "Welton Court" is typical of Mr. Bedford's work: a low house, the lower storey of stone, the upper of half-timber, with a tile roof, a conception much akin to "Redhill" and savouring of work of a bygone age. "Aros" and "Pen-y-bryn," on the other hand, are two smaller houses, different in detail and design, yet each suggesting the work of Mr. Voysey. This brief review gives some idea of the work done when Mr. Bedford left Leeds last year. Leaving behind him a promising practice, he commenced work in London, almost an unknown man compared with his reputation in his native county, but before he had been in the metropolis more than a few months he was within an ace of winning a larger competition than any he had hitherto attempted. In placing his design second among those of more than a hundred architects, the assessor of the Newcastle Grammar School competition said it was "magnificent," and only regretted that a defect in planning detracted from its otherwise praiseworthy qualities. Besides this work, Mr. Bedford was building a convalescent home without any remuneration, and was also doing several domestic buildings

which, had he lived, he would probably have regarded as his best work. So sudden a close to such a brilliant and promising career is a distinct loss to the profession. As a man he was quiet and reserved. His most characteristic feature was his love of his work, which he always regarded as an art rather than a business, and he always insisted that an architect should receive an artist's training besides his ordinary office routine. His tastes outside his work were very simple, and in gardening and similar amusements he found his recreation.

OUR PLATES.

PARTICULARS of the steelwork at the London Coliseum are given in the article in this issue dealing with the theatre. —The fish-market at Blois is a characteristic example of modern French design, and is especially interesting as the work of a municipal architect, M. Renou. The roof is constructed entirely of reinforced concrete, the piers being of white stone. Below the cornice level the walls are faced with cream glazed bricks with a grey-blue border, and the lower part with sandstone firebricks of a green tone. The tables are of marble, and the side tanks and central basin of reinforced concrete. The total cost was 27,000 francs (say, £1,080).



FACADE TO FISH MARKET AT BLOIS.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING :			
Dec. 15	Monaghan, Ireland—Asylum Buildings	District Lunatic Asylum	T. F. M'Namara, 50 Danson Street, Dublin.
" 15	Great Grimsby—Stables	Co-operative Society, Ltd.	A. Gooseman, Cleethorpe Road, Grimsby.
" 15	Batley, Yorks—Fire Station	Corporation	Waterworks Engineer's Office, Batley.
" 15	Fraserburgh, N.B.—Hospital	Town Council	B. Reid, Saltoun Square, Fraserburgh.
" 15	Sheffield—Shops	Ancient Order of Foresters	Hall & Fenton, 14 St. James's Row, Sheffield.
" 16	Scarborough—Toll Lodges	Town Council	Marine Drive Engineer, 57 Sandside, Scarborough.
" 16	Wisbech—Enlargement of Post-office	Commissioners	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 16	Cirencester—Rebuilding Pumping-Station	Urban District Council	Town Surveyor, Cirencester.
" 16	Stubbington—Coastguard Buildings	—	Superintending Engineer, H.M. Dockyard, Portsmouth.
" 17	Mountain Ash, Wales—School	Rev. H. Irvine	F. R. Bates, 26 Westgate Chambers, Newport.
" 17	London, S.E.—Library	Lewisham Libraries Committee	A. L. Guy, 4 Verulam Buildings, Gray's Inn, W.C.
" 19	Peterhead, N.B.—Hospital	Town Council	T. H. Scott, Town House, Peterhead.
" 19	Hindley, Lancs—Conversion of Old Council Offices	Urban District Council	A. Holden, Council Offices, Hindley.
" 19	Beckenham—Cottages	Urban District Council	J. A. Angell, Surveyor, Beckenham.
" 19	Haddington—Post-office	—	Post-office, Haddington.
" 19	Glasgow—Boathouse	Corporation	Office of Public Works, City Chambers, Glasgow.
" 19	Cwmaman, Wales—Houses and Shops	Aberneil Building Company	Smith & Davies, Abardare.
" 19	Birkenhead—Sanitary Towers	Guardians	E. Kirkby, 5 Cook Street, Liverpool.
" 20	Alford, Lincs—Residence	—	W. Mortimer & Sons, Corporation Street, Lincoln.
" 20	Lambeth—Conversion of School into Home	Guardians	W. Thurnall, Clerk, Guardians' Office, Brook Street, Kennington Road, S.E.
" 20	Pontypridd—Additions to School	Education Committee	P. R. A. Willoughby, Surveyor, Pontypridd.
" 20	Blackpool—Conveniences	Corporation	J. S. Brodie, Town Hall, Blackpool.
" 20	Plymouth—Dwellings	Corporation	Hine & Odgers, Lockyer Street, Plymouth.
" 20	Compstall, Stockport—Alterations to School	Unions	H. Beswick, Newgate Street, Chester.
" 21	London, S.E.—Convenience	Southwark Borough Council	A. Harrison, Town Hall, Walworth Road, S.E.
" 21	Cymmer—Alterations to Club	Committee	Workmen's Club and Institute, Cymmer.
" 22	Weymouth—Post-office	Commissioners	H.M. Office of Works, Storey's Gate, S.W.
" 22	Cork—Town Hall	Town Council	City Engineer, Municipal Building, Albert Quay, Cork.
" 23	Cefn Hergoed, Bridgend—Hospital	Hospital Committee	P. J. Thomas, Architect, Bridgend.
" 23	Wombwell, Yorks—Library	Urban District Council	A. B. Linford, Carlton Villa, Wombwell.
" 24	Dartmouth—Slaughter-houses	Corporation	A. Smith, Victoria Chambers, Dartmouth.
" 26	Stratford-on-Avon—Repairs to House	Town Council	R. Dixon, Municipal Offices, Stratford-on-Avon.
" 27	London, S.E.—Stables	Lewisham Borough Council	Surveyor's Department, Town Hall, Catford.
" 28	Londonderry—School	Municipal Technical Construction Committee	D. Conroy, 21 Shipquay Street, Londonderry.
" 31	Newcastle, N.B.—Fever Hospital	Liddesdale District Committee	A. Inglis, 12 Bridge Street, Hawick.
Jan. 4	Buxton—Milnthorpe Homes	—	W. R. Bryden, F.R.I.B.A., Buxton.
" 4	Felixstowe—Coach-house	W. G. Clarke	H. W. Buxton, 26 Hamiton Road, Felixstowe.
" 4	Wesbury—Wesleyan Sunday School	—	Danby & Simpson, 73 Albion Street, Leeds.
" 4	Radcliffe-on-Trent—Shops	Co-operative Society	Calvert & Gleeve, Low Pavement, Nottingham.
" 4	Long Eaton—Ten Houses	—	E. B. Ridway, Main Street, Long Eaton.
" 4	Newhaven, Sussex—Hospital	Urban District Council	F. J. Rayner, 34 Meeching Road, Newhaven.
" 4	Sunderland—Taking down Old Post-office and erecting New Building.	Commissioners	Henderson & Hall, 28 John Street, Sunderland.
" 9	Walthamstow—Alteration, &c., to School	Education Committee	H. Prosser, Education Committee Offices, High Street, Walthamstow.
No date	Oldbury—100 Houses	—	G. Payton, 58 New Street, Birmingham.
"	Wothorpe, Stamford—Residence	Mr. H. V. Cobbold	J. G. Stallebrass & Sons, North Street, Peterborough.
"	Grange-over-Sands—Two Houses	—	H. E. Illingworth, 8 East Parade, Leeds.
ENGINEERING :			
Dec. 15	Bilston—Isolation Hospital	Urban District Council	J. P. Wakefield, Town Hall, Bilston.
" 16	Carrick-on-Suir, Ireland—Sinking Well	Urban District Council	Clerk, Urban District Council, Carrick-on-Suir.
" 16	Londonderry—Waterworks	District Lunatic Asylum	M. A. Robinson, Richmond Street, Londonderry.
" 19	Ilford—Fire Alarm	Urban District Council	H. Shaw, Town Hall, Ilford.
" 19	Welwyn, Herts—Oil-engine	Rural District Council	Walker & Son, Albion Chambers, King Street, Nottingham.
" 19	Pontypridd—Main-laying	Waterworks Company	Manager's Office, 28 Gellimasted Road, Pontypridd.
" 20	Swindon—Dynamo	Corporation	J. G. Griffin, Electricity Works, Swindon.
" 20	Bangor, Ireland—Gas Meters	Urban District Council	B. Mitchell, Bangor.
" 21	Amsterdam—Metal Superstructure for Bridges	—	M. Nighoff, The Hague.
" 21	Cardiff—Pumping Machinery, &c.	Corporation	W. Harpur, Borough Engineer, Cardiff.
" 21	Southend—Boilers, &c.	Corporation	W. G. J. Keenan, Borough Electrical Engineer, Southend-on-Sea.
" 22	Glasgow—Electric Motor Equipment	Corporation	J. Dalrymple, 102 Penfield Street, Glasgow.
" 22	Manchester—Switchboards, &c.	Ship Canal Co.	W. H. Hunter, 41 Spring Gardens, Manchester.
" 23	Hull—Footbridge, Subway, &c.	Corporation	A. E. White, Town Hall, Hull.
" 26	Leith—Tramway Cars	Corporation	T. B. Laing, Council Chambers, Leith.
" 27	Johannesburg—Cranes	Municipal Council	Mardey & Dawbarn, 82 Victoria Street, S.W.
" 27	Johannesburg—Transformer Pillars	Municipal Council	Mardey & Dawbarn, 82 Victoria Street, S.W.
" 31	Drogheda—Heating	—	Town Clerk, Courthouse, Drogheda.
" 31	London, S.E.—Electric Bells, &c.	Camberwell Borough Council	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
Jan. 1	London—Engineering Work	Corporation	Engineer's Office, Public Health Department, Guildhall, London.
" 3	Tottenham—Engine Beds, &c.	Drainage Committee	P. S. Murphy, Coombes Croft House, 712 High Road, Tottenham.
" 5	Carmarthen—Sinking Well, &c.	Education Committee	W. D. Jenkins, Shire Hall, Carmarthen.
" 23	Epsom—Hot-water Plant, &c.	Asylums Committee	Clerk to Committee, 6 Waterloo Place, S.W.
" 28	Giurgevo, Roumania—Electric Light	—	Municipal Offices, Giurgevo.
April	Lulea, Sweden—Dredging	—	Harbour Office, Lulea, Sweden.
May 1	Suakin (Red Sea)—Lighthouse	Ports and Lights Administration	Deputy-Controller-General, Ports and Lights Administration, Alexandria, Egypt.
IRON AND STEEL :			
Dec. 15	Downpatrick—Fire-escape Stairs	District Lunatic Asylum	Medical Superintendent, Downpatrick Asylum.
" 16	Hayward's Heath, Sussex—Iron Water-mains	Cuckfield Rural District Council	D. Rankine, Council Offices, Hayward's Heath.
" 19	Hindley, Lancs—Fencing	Urban District Council	A. Holden, Council Offices, Hindley.
" 24	Brazil—Metallic Wire	Central Railway	Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
PAINTING AND PLUMBING :			
Dec. 15	Barnstaple—Painting External Wood, &c.	Urban District Council	Borough Surveyor's Office, Barnstaple.
" 16	Preston—Painting, &c., Police-station	Corporation	Borough Surveyor, Town Hall, Preston.
Jan. 1	London—Painting and Plumbing Work	Corporation	Engineer's Office, Public Health Department, Guildhall, London.
ROADS AND CARTAGE :			
Dec. 15	Hale, Cheshire—Making-up Roads	Urban District Council	T. Blagburn, Hale.
" 15	Leicester—Granite	Corporation	E. G. Mawbey, Town Hall, Leicester.
" 16	Preston—Paving	Corporation	Borough Surveyor, Town Hall, Preston.
" 17	Maidstone—Materials	Bridges and Roads Committee	County Surveyor, Maidstone.
" 19	London, N.—Making-up Streets	Edmonton Urban District Council	G. E. Eachus, Town Hall, Lower Edmonton.
" 19	Stevenage—Levelling, Kerbing, &c.	Urban District Council	Council Offices, Orchard Road, Stevenage.
" 20	Wembley—Making-up Road	Urban District Council	C. R. W. Chapman, Public Offices, Wembley.
" 20	Reigate—Street Improvement Works	Town Council	Borough Surveyor, Municipal Buildings, Reigate.
" 21	Fulham—Making-up Roadway	Council	F. Wood, Town Hall, Fulham.
" 21	Barnet—Street and Sewer Work	Rural District Council	T. England, 14A Mount View, Bellshill, High Barnet.
" 23	Newmarket—Tar-paving Materials	Urban District Council	S. J. Ennion, Deva Chambers, Newmarket.
" 28	Carmarthen—Road Materials, &c.	County Council	C. H. Mounsey, County Surveyor, Carmarthen.
" 31	Horsham—Flints, &c.	Roads and Bridges Committee	W. McIntosh, Worthing Road, Horsham.
Jan. 20	Willesden—Road-making, &c.	District Council	O. C. Robson, Public Offices, Dyne Road, Kilburn.
SANITARY :			
Dec. 17	Liversedge, Yorks—Sewers, &c.	Urban District Council	Gott & Sons, 8 Charles Street, Bradford.
" 17	Spennymoor, Durham—Disinfectants	Urban District Council	Sanitary Inspector, Spennymoor.
" 19	Birkenhead—Sanitary Tower, &c.	Guardians	E. Kirkby, 5 Cook Street, Liverpool.

Keystones.

Competitive Designs are to be invited for extensions to the Eton Workhouse. Premiums of 60, 30 and 20 guineas will be offered.

An Inebriates' Home has been erected by the Lanark County Council at Hairmyres. It accommodates ten patients. Mr. A. N. Paterson, of Hamilton, was the architect.

"Cheap Cottages."—By a printer's error "The County Gentleman" was referred to as "The Country Gentleman" on p. 297 of our last week's issue.

Competition for Wesleyan Hall, Westminster.—Sir Aston Webb has reported to the trustees on the 126 sets of designs submitted in this competition, which are hanging in the Examination Hall of the Royal College of Physicians, Victoria Embankment. The award will be made public very soon.

L.C.C. Offices.—The Establishment Committee are to report to the London County Council as quickly as possible upon sites available for a county hall and offices, and to make a definite recommendation for the acquisition of the site which they consider to be the most suitable. At present twenty-five separate blocks of buildings are rented for the Council's various staffs, at a cost of £34,000 a year.

Scorn for the Institute.—At last week's meeting of the Berwick Town Council a memorial was submitted from the Royal Institute of British Architects praying that architectural work be not placed in the hands of surveyors or engineers, but that duly qualified architects should be employed. The mayor thought the letter should be laid on the table unread. It was impudent interference with their right to employ whom they chose. They were not to be allowed to recognize merit or worth unless it began with the Institute. The letter was laid on the table.

Mr. W. H. Dashwood Caple, architect and diocesan surveyor, has been elected to represent the central ward on the council of the county borough of Cardiff.

Competition Reform Society.—The committee disapprove of the conditions in the competition for a new elementary school at Cheltenham because there are no premiums, no professional assessor, and the promoters do not bind themselves to accept any plans sent in. They also object to the conditions in the competitions for a chapel, school-room, &c., at Swansea, and the Northumberland War Memorial, the latter because there is no professional assessor and the former because, "unless a majority of the committee is definitely decided that one set of plans is the best, an assessor may be appointed to determine between the first four —." Members are requested to abstain from competing unless the conditions are satisfactorily revised.

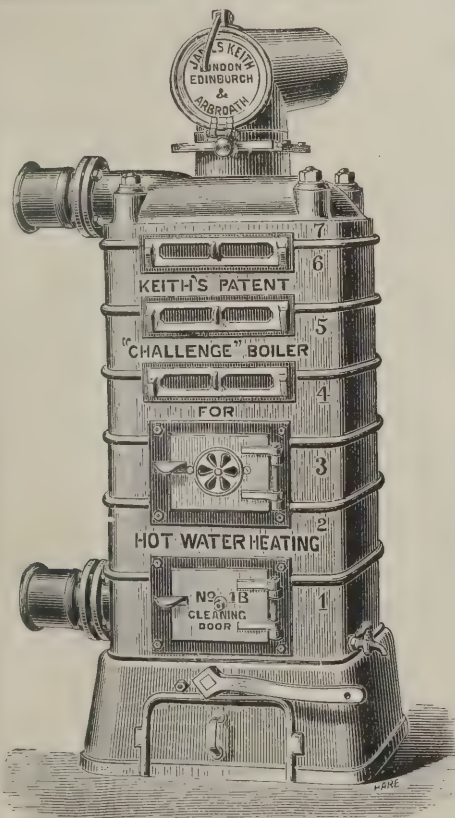
The London Building Act.—At yesterday's meeting of the London County Council the Parliamentary Committee reported that, in accordance with the instructions of the Council on November 15th and on the general lines indicated in the report of the Building Act Committee presented on November 8th, they had prepared the London Building Acts (Amendment) Bill, which seeks to amend the Acts relating to buildings in London. They were, however, unanimously of opinion that it was undesirable to give effect to the Council's resolution with regard to the proposed reconstitution of the Tribunal of Appeal, increasing the number of members from three to five, and they asked the Council instead to make provision in the Bill to require the existing Tribunal of Appeal to state their reasons when giving a decision. They propose to submit the Bill as soon as possible to the various professional bodies and local authorities for their consideration and views.

Mr. Edwin T. Hall, F.R.I.B.A., has been appointed consulting architect to the new Robroyston Hospital about to be erected by the Glasgow Corporation.

Ownership of Architects' Drawings.—The Council of the Royal Institute of British Architects have resolved to devote a sum of not more than £100 towards upholding the appeal in the case of *Gibbon v. Pease*, with a view to establishing the right of architects to retain their working drawings and not deliver them up to clients on payment of commission.

Royal Institute of the Architects of Ireland.—Mr. William M. Mitchell delivered his presidential address on Thursday last. He stigmatized the action of the Government in appointing an English architect (Sir Aston Webb) to design the new buildings for the College of Science in Dublin as unfair and a deliberate slight. Speaking of registration, he said the object was in itself an excellent one, and would ultimately prove of immense benefit to architects; at the same time it was well not to be too sanguine about any immediate realization of this.

The Architectural Prize Winners at the Royal Academy Schools are this year as follows:—Travelling Studentship (value, £60), Mr. Leslie Wilkinson. Set of architectural drawings, silver medal (first prize), Mr. John Swarbrick; silver medal (second prize), Mr. William Harvey. Set of architectural designs (prize, £25), Mr. Percy Ion Elton. Perspective drawing in outline, open to architects only (silver medal), Mr. Leslie Wilkinson. Set of drawings of an architectural design, first prize (£15), Mr. B. C. E. Bayley; second prize (£10), Mr. Leslie Wilkinson. Architectural design with coloured decoration (silver medal), Mr. William Harvey. Design for the decoration of a portion of a public building (prize £40), Mr. George Howard Short.



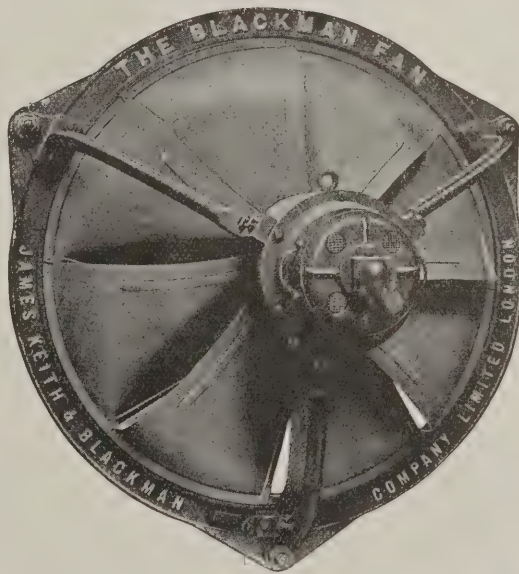
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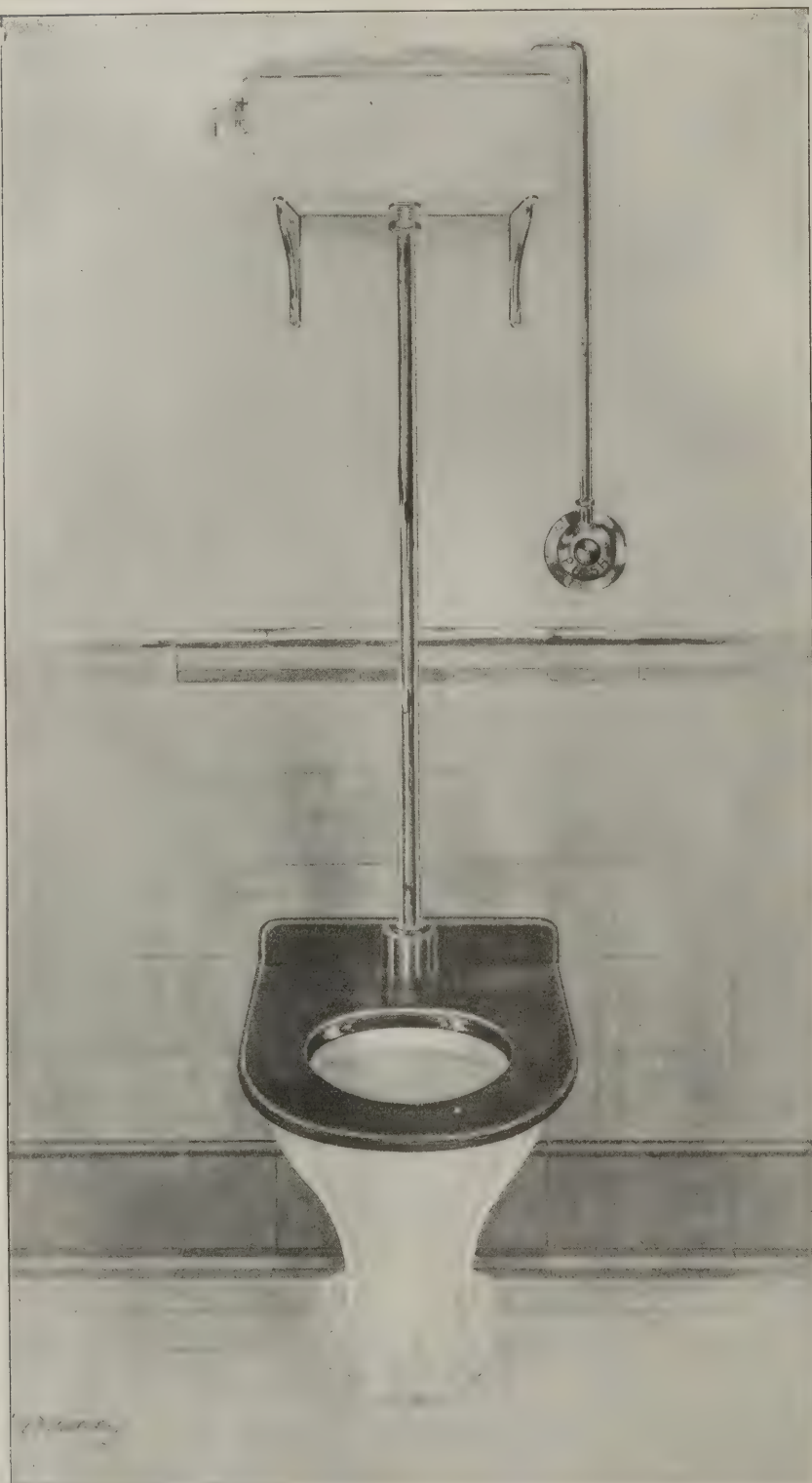
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Complete List of Contracts Open.—continued.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
	SANITARY—cont.		
Dec. 19	Settle—Sewer Works	Rural District Council	Barber, Atkinson & Co., Craven Bank Chambers, Keighley.
" 21	Cheltenham—Sewerage Works	Rural District Council	N. Larley, Sanctuary, Westminster, S.W.
" 21	Headcorn, Kent—Sewerage Works	Rural District Council	Fairbank & Son, Lendal Chambers, York.
" 21	Bacup—Sewer, &c.	Corporation	W. H. Elce, Borough Engineer, Bacup.
" 31	Barnet—Construction of Sewers	Rural District Council	T. England, 14A Mount View, Bells Hill, High Barnet.
" 1905	Wigmore, Herefordshire—Sewerage Works	Rural District Council	Wilcox & Parkes, 63 Temple Row, Birmingham.
No date	Linslade, near Leighton Buzzard—Sewage-disposal Works	Urban District Council	Sands & Walker, Milton Chambers, Nottingham.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.*	DEPOSIT REQUIRED FOR CONDITIONS, &c.*	FROM WHOM PARTICULARS MAY BE OBTAINED.
Dec. 17	Belfast—Libraries	—	—	Chairman, Public Library, Royal Avenue, Belfast.
" 20	London, S.E.—Converting School into Home	—	—	W. Thurnall, Clerk, Brook Street, Kennington Road, S.E.
" 21	Egremont, Cheshire—Public Offices	£250, £75 & £50.	£2 2s.	H. W. Cook, Public Offices, Egremont.
" 21	Cardiff—Pumping Machinery	—	£5 5s.	W. Harpur, Town Hall, Cardiff.
" 26	London, S.E.—Conversion of School into Home... ..	—	—	W. Thurnall, Brook Street, Kennington Road, S.E.
" 31	London, W.C.—Perspective Drawing	—	—	Sanders & Harding, 56 Lincoln's Inn Fields, W.C.
1905.				
Jan. 31	Llanelli—Remodelling School Buildings	£20 & £10.	—	
Dec. 31	Spezia—Drainage Scheme	£400.	—	Ill Signor, Sindaco della Spezia.

* Where a dash is given it does not necessarily mean that no premiums are offered and no deposit is required, but that we have not been informed what these are (if any).

Coming Events.

Wednesday, December 14.

SOCIETY OF ENGINEERS.—Fiftieth Annual Dinner.
ROYAL PHILOSOPHICAL SOCIETY OF GLASGOW.—Mr. Horatio K. Bromhead, F.R.I.B.A., on "Registration of Architects," at 8 p.m.
BRITISH ARCHÆOLOGICAL ASSOCIATION.—Meeting at 32, Sackville Street, W., at 8 p.m.
SOCIETY OF ARTS.—Mr. C. D. Abel on "The Patent Laws," at 8 p.m.
EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. Nelson Dawson on "Metalwork," at 8 p.m.
ARCHITECTURAL ASSOCIATION (Discussion Section).—Mr. Theodore Fyfe on "The Natural Lighting of Interiors," at 7.30 p.m.
CHEMICAL SOCIETY.—Meeting at Burlington House at 5.30 p.m.

Thursday, December 15.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—Professor Capper on "Choisy's Researches in Ancient Building Construction," at 6.30 p.m.
INSTITUTE OF SANITARY ENGINEERS.—Dr. Thresh on "Water and Water Supply—II," at 7 p.m.
INSTITUTION OF ELECTRICAL ENGINEERS.—Mr. W. P. Adams on "The Combination of Dust Destructors," at 8 p.m.

Friday, December 16.

INSTITUTION OF MECHANICAL ENGINEERS.—Paper on "Heat Treatment Experiments with Chrome-Vadium Steel," and further discussion on "Impact Tests on the Wrought Steels of Commerce," at 8 p.m.
UNIVERSITY COLLEGE.—Mr. D. S. MacColl on "Constable," at 4.30 p.m.
GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Mr. James S. Boyd on "The Construction and Setting-out of a Fleche for a Church Roof," at 8 p.m.
INSTITUTION OF CIVIL ENGINEERS (Students' Meeting).—Mr. R. H. Lee Pennell on "Folkestone Harbour: Cylinder-sinking at the Root of the Old Pier," at 8 p.m.

Monday, December 19.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Mr. Lacy W. Ridge and Mr. J. S. Gibson on "Architecture and Building Acts," at 8 p.m.

LIVERPOOL ARCHITECTURAL SOCIETY.—Mr. John Murray on "Scotch Plasterwork of the Sixteenth and Seventeenth Centuries."

SURVEYORS' INSTITUTION (Students' Section).—Discussion on "The Growth of Large Cities," at 7 p.m.

Tuesday, December 20.

ARCHITECTURAL ASSOCIATION (Camera and Cycling Club).—Mr. Arnold Mitchell, F.R.I.B.A., on "Photography for Architects," at 8 p.m.
SOCIETY OF ARTS.—Mr. T. G. Jackson, R.A., on "Street Architecture," at 8 p.m.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending December 9th twenty-seven failures in the building and timber trades in England and Wales were gazetted.

G. BAKER & SON, builders, Wimborne. R.O. Nov. 28th.
SUTTON & SONS, builders, Basingstoke. R.O. Dec. 2nd.
H. TRIBE, builder, East Liss, Hants. R.O. Nov. 28th.
H. ULPH, builder, Putney. R.O. Dec. 1st.
W. CURBSTONE & Co., patent glazing engineers, Manchester. Liabilities £2,891; assets £2,497.

T. BAINES, joiner and builder, Preston. R.O. Dec. 2nd.

R. J. NIXON, sculptor and mason, Liverpool. R.O. Dec. 2nd.

J. T. WRIGHT, surveyor and estate agent, Liscard. R.O. Dec. 2nd.

J. E. BUCKELDEE, builder, Hillingdon, near Uxbridge. Adj. Nov. 19th.

MARSHALL & COPPIN, builders and contractors, Carlton. R.O. Nov. 28th. P.E., Nottingham C.C., Jan. 13th, at 12.

J. DAY, builder, Codsall Wood, late of Wolverhampton. R.O. Nov. 30th.

C. HITCHINGS, plumber, West Norwood. P.E., Wandsworth C.C., Jan. 12th, at 12.

H. BOWKER, builder and contractor, Hale. Adj. Dec. 1st.

PARSONS & STENT, builders, Great Shelford. First meeting, O.R.'s, Cambridge, Dec. 14th, at 10.30. P.E., Cambridge Guildhall, same date, at 11.

J. E. JACKSON, joiner and cabinet-maker, Todmorden. First meeting, O.R.'s, Preston, Dec. 14th, at 11. P.E., Burnley C.C., Dec. 30th, at 10.45.

J. GARNER, builder, Crewe. Total liabilities £13,891; £2,745 expected to rank for dividend; assets £3,377; estimated surplus £633.

W. GASKIN, builder, Canterbury. R.O. Nov. 28th. First meeting, O.R.'s, Canterbury, Dec. 15th, at 12. P.E., Canterbury Guildhall, same day, at 10.

P. E. BIRCHNELL, monumental mason, Plumstead. R.O. Dec. 1st. First meeting, 24, Railway Approach, London Bridge, Dec. 15th, at 12.30. P.E., Greenwich C.C., Dec. 20th, at 1.

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The Restoration of Peterborough Cathedral is stopped for want of funds. During the year the clearstory window on the north side of the choir, which was sinking and falling away, has been reset and strengthened with bonders, and the large octagonal turrets with spires on either side of the apse have been pointed and repaired. The response to an appeal for funds was not, however, sufficient to justify the restoration committee in proceeding with the repair of the north and south transepts, for which about £1,200 is still required.

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AN ARCHITECT is willing to render assistance in his own office in the preparation of perspectives, designs, working drawings, quantities, &c.—CHAS. CARTER, M.S.A., Sherwood Lodge, Nottingham. 386

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ARCHITECT'S ASSISTANT (Scotch, presently engaged) desires experience in another London office, 10½ years' experience, salary about £2 5s.—EAVES, c/o Birmingham, 2, Titchborne Street, Hyde Park, W. 793

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BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

December 21, 1904. Vol. 20, No. 515.

6, Great New Street, Fetter Lane, E.C.

SUMMARY.

Mr. Sydney Perks is the new City Surveyor. (Page 334.)

Nine firms of architects have been selected to send in designs in the final competition for the Wesleyan Church House, Westminster. Each will receive 100 guineas. (Page 334.)

The council of the Royal Institute of the Architects of Ireland expresses profound regret at the rapidly increasing tendency of public bodies, as well as private individuals, to bring over English and Scotch architects whenever occasion offers. In the face of the present state of things they say they cannot conceal a degree of alarm as to the future of the profession in Ireland. (Page 336.)

Mr. Richard Mawson, architect, of Bradford, is dead. The firm of which he was the head has been connected with many large undertakings, including Sir Titus Salt's model village, Bradford Town Hall, the Kirkgate Market, the City Temple, London, Wallis's premises on Holborn, &c. (Page 334.)

At Cannington, on the Axminster and Lyme Regis Light Railway, a concrete viaduct of ten elliptical arches has been constructed, the maximum height being 92ft. This is the first instance where piers of a similar height have been built without scaffolding, and in which the centres of a 50ft. arch have been designed for setting in one piece. (Page 337.)

New roofs to Corstorphine Church, near Edinburgh, have been ingeniously constructed of Granolithic slabs and reinforced concrete, with Granolithic slates on top measuring 6ft. by 2ft. and weighing about 7 cwt. each. (Page 329.)

Water pipes and fittings are to be standardized. Under the new system it is estimated that the fittings of an ordinary house will not come to more than 4s. and larger houses 6s. (Page 335.)

Mr. Joseph Jopling, in a paper he read before the Surveyors' Institution, said he did not attach much importance to makers' certificates giving results of crushing tests on bricks. It was difficult to conceive in practice a properly-burnt brick of any kind in a position where it would be crushed by the superincumbent load. If the maximum pressure was, say, 1 ton per sq. ft., and we used bricks that would carry 10 tons, why be influenced by a certificate setting forth that certain bricks would carry 30 tons? There was no advantage whatever. (Page 331.)

Anxiety is expressed for the safety of St. Mark's, Venice. There is no immediate danger, but the foundations are seriously faulty. (Page 334.)

In the *personnel* of the Royal Commission on the Traffic of London Streets all architects have been ignored, and no architects have appeared before it to express views on the laying-out and design of London streets. (Page 330.)

Events of the Year.

NEXT week we shall publish our illustrated summary of the architectural and building events of 1904. The compilation of such a record is necessarily an onerous task, as many difficulties are experienced in obtaining photographs and drawings of all the chief buildings erected in various parts of the kingdom. From the expressions of opinion, however, which have reached us from different quarters, we think this illustrated summary will be very much appreciated. In these days of rush, people will not read columns and columns of unbroken matter in regard to such a subject—in fact, we doubt very much whether many long reports of society meetings are read, even though the papers are often valuable. Yet there is always time to look at illustrations, and we feel sure our supplement will be examined from page to page with the greatest interest; while as the essential particulars will be given next to the illustrations to which they relate, reference will be easy. Last year we devoted eight pages to this supplement—the first of its kind published. This year we have extended it to sixteen pages, and though this is additional to the ordinary issue no extra charge will be made.

An Excavation of World Interest.

THE proposed excavation of Herculaneum, buried under the great eruption of Vesuvius that took place at the beginning of the Christian era, is a matter of world-wide interest, and we are glad to hear from Professor Waldstein that it is receiving international support. Pompeii was buried to an average depth of 15ft. in fine ash and pumice, while Herculaneum was buried in molten mud to a depth of 70ft., and it is on account of the popular fallacy that this mud was impenetrable lava that so very little has been done towards excavating the town. In the reign of George III. the then Prince of Wales provided money for certain excavations to be carried out, and one villa was disclosed, but since then nothing has been done. Yet in this one villa more Grecian art treasures were discovered than in the whole of Athens or Delphi or the Parthenon, and the fluid mud which filled every nook and cranny had kept everything in a wonderful state of preservation. If Herculaneum were excavated Professor Waldstein considers that the treasures which would then be revealed would be of infinitely greater value than those of Pompeii, for Pompeii was merely a mercantile centre, whereas Herculaneum was a centre of art and culture. And it now seems certain that this great work will at last be undertaken, for the approval of King Edward has been expressed, and the King of Italy, as well as his Prime Minister, have promised support, while the President

of the United States, the German Emperor, the President and Government of the French Republic, the Emperor of Austria and the King of Sweden encourage the undertaking. There is already a committee in Vienna, and it is hoped to secure the co-operation of many other national committees.

Ownership of Drawings.

THE question of the ownership of architects' drawings is, happily, not being allowed to rest. Long ago (in our issues for November 6th, 1901, and September 10th, 1902) we objected to the idea that an architect's drawings were the property of the client, which interpretation the legal profession had placed upon the judgment in the case of *Ebdy v. McGowan*. The Royal Institute of British Architects and the Surveyors' Institution have each promised contributions of £100, and the Society of Architects £50, towards the cost of endeavouring to obtain a reversal of the verdict in the recent case of *Gibbon v. Pease*, where the judgment given followed that of the case named above, and the profession generally has the opportunity of aiding by subscribing to a fund opened by the editor of our contemporary "The Builder." It should be decided once and for all that an architect's province is to provide a building and not to furnish drawings from which it can be erected. The drawings and specifications are merely the means by which he transmits his ideas to the workmen. They convey knowledge which is an architect's stock-in-trade, not purchased outright by the client. All a client ordinarily pays for is a lease of that private knowledge for the one job in hand, just as a manufacturer pays a royalty to a patentee for the use of an invention.

An Architectural Novel.

FOR a long time Mr. Pecksniff was practically the only architect known to English fiction, and his qualifications and attainments were hardly brilliant. Then, as many know, Thomas Hardy, himself educated as an architect, not only made the hero of "The Laodiceans" an architect, but gave his plot an architectural setting and development. But it is not commonly known that about twenty-five years ago Professor Kerr, who lately died in his eighty-second year, wrote a novel, "The Ambassador Extraordinary," in which, in the person of Master Georgius Oldhousen, F.S.A., the marked peculiarities of two of the author's contemporaries, William Burges and Edward W. Godwin, were mercilessly caricatured. Commenting on this, the "American Architect" observes that Professor Kerr was a most useful member of the profession, as he was by instinct a "kicker" and had very unusual oratorical gifts.

ELY.

By EDWARD WALKER.

THE visitor to East Anglian Fenland can hardly fail to admire the determination and perseverance with which our forefathers encountered the difficulties in the building of the mighty fabrics at Ely, Peterborough and Lincoln. The accomplishment of their task must be regarded as little short of marvellous when the condition of this part of the country ten centuries ago is borne in mind, and when it is remembered that building materials—stone and timber at any rate—must necessarily have been brought from less marshy districts. During draining operations in the Lincolnshire Fens many years ago a sunken barge of an ancient type, whose timbers were black with age and long immersion, was discovered laden with large blocks of stone. There can be little doubt that this boat had become submerged in the "leam," or water-way, probably constructed for the purpose of conveying heavy building materials to one of the abbeys or monasteries in course of erection seven or eight centuries ago. An ancient chronicler of Ely Cathedral bears testimony to the pluck with which the obstacles presented by the all but impassable state of the surrounding country, the marshy subsoil and remote position were met and overcome, when he informs us that a distinguished Ely architect of the fourteenth century, having discovered in a neighbouring district some oak timber trees of the scantling he required, was fain to wait until a causeway or path sufficiently solid to bear the conveyance of the timber had been made across the fens.

The Isle of Ely—famed in song and story as the "camp of refuge" of the last of the English, where the hope of English freedom struggled on for a few short years under the leadership of Hereward the Wake—cannot now be strictly so called, although, standing



FRONT OF SOUTH TRANSEPT, ELY CATHEDRAL.

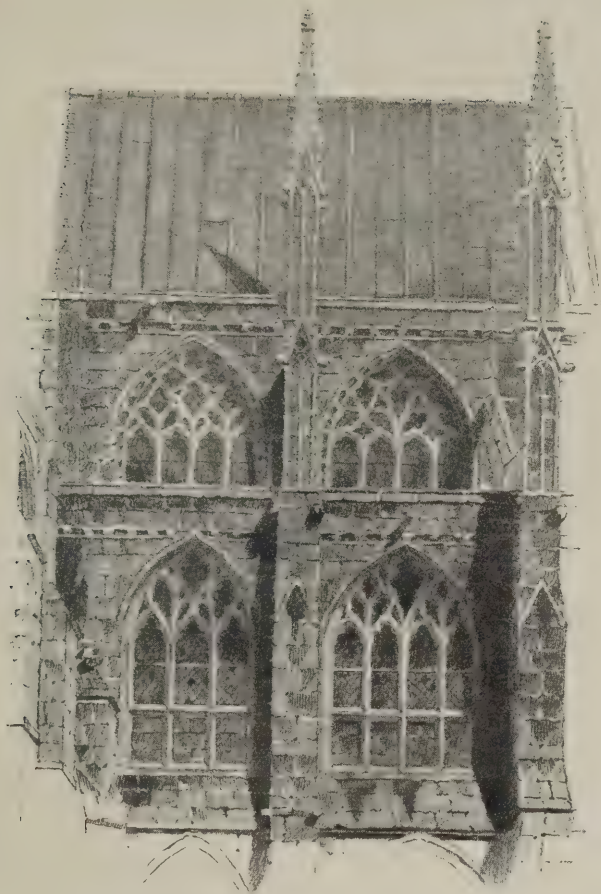


THE PRIORS' DOOR, ELY. DRAWN BY EDWARD WALKER.

on the hill crowned by the cathedral or, better still, on the battlements of the cathedral tower, no great effort of the imagination is needed to conjure up a more or less vivid picture of what the isle must have been like in the days of "the Wake." What is now rich country, dotted here and there with red-roofed cottages or substantial farmsteads, or in the fall of the year with fields of waving corn, was in former days a bleak drear morass.

The abbey, or rather the twin monastery, of Ely—there being little doubt that the establishment consisted of both monks and nuns—was founded in the year 673 by Etheldreda, a princess of the royal blood, who was herself the first abbess.

For 200 years the life of the little island sanctuary went on undisturbed, but in 870 came the Danish pirates, who sacked and burned the convent and the church. For a century afterwards the ruins remained undisturbed. Then, in more peaceful times, Abbot Ethelwold, bishop of Winchester, reorganized the old Ely convent as a Benedictine House, and the new abbey and restored church were consecrated by Saint Dunstan in 970. Of Ethelwold's church, like the convent founded by Etheldreda, not a vestige remains, for, twelve years after the capitulation of the isle, namely, in 1083, Ethelwold's building was demolished and the foundations of the present structure were laid by Abbot Simeon, brother of Walkelin of Winchester and a relative of the Conqueror. Simeon was, we learn, ninety years old when he came to Ely, but he lived ten years more, long enough to see his ideas taking definite shapes in the north and south transepts as we find them to-day, in the foundations of the four piers to carry the great central tower, and eastwards in the apsidal end of



TWO BAYS OF CHOIR, ELY CATHEDRAL. DRAWN BY EDWARD WALKER.

the choir. Of these two latter works the former only was carried out, and neither has come down to our time.

Throughout the twelfth century the building of the great arches of the nave was gradually proceeding westward, the lower storeys of the great western tower were climbing higher, and towards the latter part of the century the galilee transepts—rivalled only at Lincoln and Durham—were in course of completion.

The architecture of the nave at Ely, like that of the sister churches of Norwich and Peterborough, is of a beautiful late Norman character, consisting of twelve bays. The nave is 208ft. in length. Its gracefully proportioned, somewhat stilted arches are separated from each other by piers of slender clustered shafts alternating in design, carrying the eye upwards through a lofty triforium arcade and beautiful clearstory to the ceiling. Here instinctively we expect to see the radiating members of more or less elaborate vaulting, but we find instead the bewildering ramifications of a vaulted ceiling like that at Norwich, a boarded ceiling of pentagonal section, with painted scriptural subjects, quiet in tone and relieved by the judicious use of gold. Whether the Norman builders mistrusted their powers when confronted with the task of covering so wide a span with a stone vault cannot be said, but it is clear that the nave was roofed in with a flat wooden ceiling as at Peterborough; this however was subsequently removed and a vault seems to have been contemplated by the fourteenth-century architects, though, for some unknown reason, not completed. A roof of plain, rough, unadorned rafters was allowed to remain until as recently as 1858, when the present ceiling was erected and painted by two accomplished amateurs, Mr. Styleman Le Strange and Mr. Gambier Parry. The first-named, acting on the advice of the late Sir Gilbert Scott (who at the time had charge of the restoration of the cathedral),



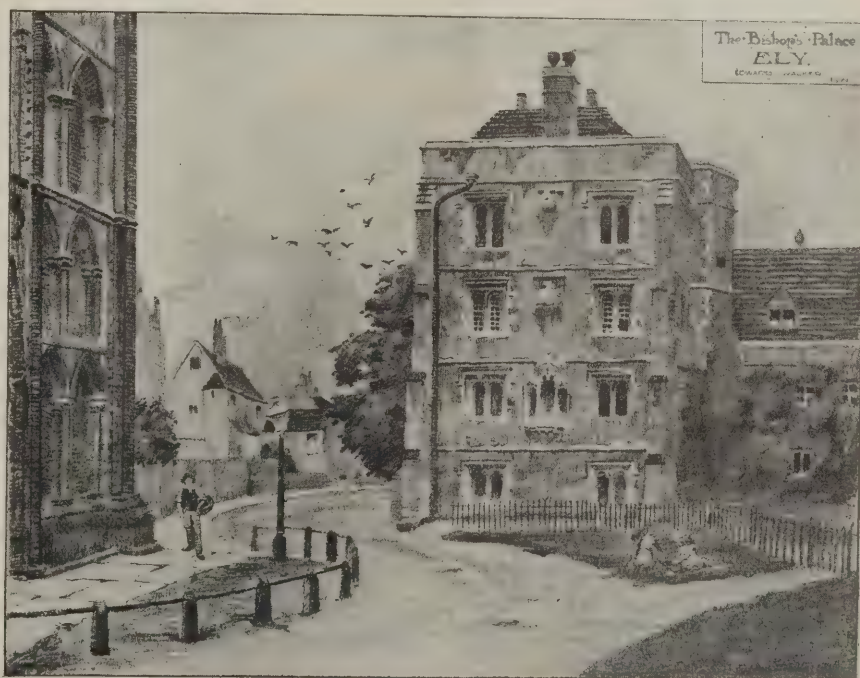
visited a famous painted ceiling at Hildesheim of a corresponding date and, says Sir Gilbert, "on that he based his design, though making it

in all its detail original, and a most excellent work, tending, through the reserve which characterized its colouring, to increase, rather than diminish, the height of the interior."

The transepts belong to the same period as the nave and were finished towards the end of the twelfth century. The south transept is the more interesting. The octagonal pyramidal turrets at the angles of the stepped gable are of very graceful proportion, and the semicircular-headed windows in the lower storeys are of good design. The deeply-

recessed window in the gable, though an addition of a later period, contributes not a little to the general beauty of the composition. Both transepts have aisles, but these have been enclosed and are used for various purposes. The arches forming the aisles are remarkable for the traces of a rich painted decoration, the pattern of which can be readily deciphered.

It was Abbot Simeon's intention to give his church an apsidal termination eastwards, similar to his brother Walkelin's model at Winchester, but his plan was not carried out, and in 1234 the present choir was commenced by Hugh de Northwold. This choir, 100ft. long, was originally composed of eight bays, but six only remain. These six bays are of the best period of Early English architecture, magnificent in all their details, and forming, with the noble eastern façade, one of the loveliest and most graceful buildings of that



glorious architectural period. The famous galilee porch which forms the western entrance of the church also belongs to this time, and is regarded by competent authorities as being without doubt one of the most beautiful examples of Early English work in the country.

In the year 1321 occurred the disaster which, paradoxical though it seem, gave to Ely its special glory—the unique octagon. Abbot Simeon's tower had been threatening ruin for a considerable time, and the brethren had not ventured to sing their offices in the choir for a long period, when, on February 12th in the year named, as the monks were retracing their steps to the dormitory after matins, this tower fell eastwards with a mighty crash, demolishing in its fall three bays of Northwold's choir. The brethren set about for some means of repairing the damage, and in Alan de Walsingham, the sacrist of the cathedral—who had already erected the Lady Chapel with its exquisite internal carving and beautifully-designed exterior—they found a man who proved himself more than equal to the occasion. He saw his opportunity and did not hesitate to avail himself of it. Setting to work with a will, he dug out the foundations for the eight piers to carry the whole weight of the octagon he proposed to build. For his base he took the whole width of the church north to south, including the aisles, by the transepts with their aisles in the opposite direction. Then by cutting off the angles of this square he obtained an octagon more than three times as large as the square upon which the central tower had stood. On these eight piers he placed a vaulting of wood, and finally on this massive structure (a model of masterly carpentry), he built a lantern of oak with a lead covering, the central boss of the lantern being 150ft. above the pavement.

Walsingham seems to have been the first northern architect to conceive the idea of dispensing with the tall narrow opening formed by a central tower carried on four piers, which had been the bathos of the style up to his time. His octagon is the work of a bold original thinker, and is unrivalled anywhere as an example of constructive genius combined with the highest artistic and æsthetic taste. Many well-known authorities tell us that Sir Christopher Wren in the design of his dome of St. Paul's was much influenced by Walsingham's work, and a comparison of the respective plans tends largely to strengthen this theory. Wren must have had many opportunities of studying Alan's masterpiece, for he was employed for a considerable time on restoration work at Ely.

Alan also replaced the three bays of the choir which had been reduced to ruin, not in their original style but in the magnificent manner of the best period of Decorated architecture. He completed this work about the year 1350.

Several less ambitious works in the immediate neighbourhood of the cathedral were also executed by this talented architect, notably the private oratory or chapel of Prior John de Crauden. "This is," says Rickman, "one of the most curious and valuable Decorated remains in the kingdom." A portion of the infirmary buildings in the cathedral close, known as "Walsingham's hall," is also Alan's design.

Up to the year 1401 the square Norman west tower had been crowned by a wooden pyramidal spire, but in that year the present octagonal campanile, plain and heavy, flanked by four corner turrets, was erected. This also was capped by a spire which, happily, has long ago disappeared.

With the exception of tombs and other minor works, the cathedral affords but few examples of Perpendicular architecture, so that, with the completion of the campanile, the great pile was finished in its characteristic outline as we see it to-day.

In close proximity to the south side of the church, and connected with it by a rich Norman doorway, known as the "Priors' door," stands the deanery, originally the guest hall of the convent. This building dates back to the days of Abbot Simeon, but was much altered and restored by Alan de Walsingham. It contains some interesting relics, in particular the large carved wood ceiling of the great hall.

The palace of the Bishops of Ely, situated near the western front of the cathedral, is a large building consisting of a central portion and two low towers. The easternmost of these was erected in the fifteenth century and is built of brick, with angle buttresses and jambs of dressed stone.

It was a saying of Lord Macaulay's that a visit to Ely was like a step back into the Middle Ages, and this feeling is forced upon us by contrasting the huge abbey-church with its surroundings; for Ely has never expanded beyond the size of a small market town or large agricultural village.

The remains of the old monastic buildings surrounding the cathedral abound with picturesque corners and quaint skylines, behind which we get an occasional glimpse of the tower or of some of the higher pinnacles of the great pile; but away from the immediate vicinity of the cathedral there is nothing in the city itself of any architectural interest, with the exception, perhaps, of one or two seventeenth- and eighteenth-century houses in the older parts; still, some of the quiet streets, flanked by humble red-tiled cottages, each with its variegated flower garden and pretty orchard behind, furnish a foreground of no common beauty for the great irregular mass of the cathedral looming beyond.

For a more detailed account of the history of Ely Cathedral the reader may be referred to the admirable little book by the Very Reverend Dean Stubbs, to whom the writer desires to express his acknowledgments for much of his information respecting the early history of the fabric.

Law Cases.

Ancient Lights Appeal Case.—The case of *Kine v. Jolly* came before the Court of Appeal last Thursday. This was an appeal from the decision of Mr. Justice Kekewich (reported on p. 73 of THE BUILDERS' JOURNAL for August 10th last) on the re-trial of a light and air case. The action was originally tried before the learned judge in December, 1903, when he granted a mandatory injunction as to so much of the defendant's building as interfered with the ancient lights, but the operation of the injunction was stayed pending an appeal to the Court of Appeal. Before the appeal came on for hearing, the judgment of the House of Lords in *Colls v. Home and Colonial Stores* was delivered, and in these circumstances the Court of Appeal remitted the case to the judge for re-trial. The plaintiff resided at a house in Acacia Road, Acton, and she complained that the defendant had recently built a house which materially obstructed the access of light to the drawing-room and morning-room on the ground floor, and to the hall of the house. The defence was that the damage was not substantial. His Lordship held that the obstruction of light to the drawing-room was not actionable, and accordingly that, as regarded that room alone, the plaintiff had no cause of action; but that a nuisance had been created by the obstruction of light to the morning-room plus the obstruction of light to the hall, and that the plaintiff was entitled to an injunction as to both. His Lordship accordingly ordered the defendant to pull down so much of his house as caused a nuisance to the plaintiff. Defendant appealed.—The Court of Appeal varied the

order of the Court below.—Lord Justice Vaughan Williams said that the question what tests ought to be applied in an action brought for obstruction of ancient lights in order to ascertain whether the plaintiff had a good cause of action had recently been very much discussed in the House of Lords in *Colls v. Home and Colonial Stores*, and the House intended to lay down rules which should be applied in future in cases of this class. He thought the decided cases were not quite consistent as to the tests to be applied. The main point of distinction between the two lines of cases was this. By one school of law the right of the house-owner gained by prescription, whether after or before the Prescription Act, was regarded as a mere right of property. By the other school this prescriptive right was regarded as a negative easement, being a right to prevent a landowner from using his land so as to constitute a nuisance to the owner or occupier of a house on the adjoining land. Those were the two rival views laid down in the cases antecedent to the recent decision in the House of Lords. The House of Lords had adopted the view that the only right gained by prescription was in the nature of a negative easement—a right to prevent your neighbour from so using his land as to injure you who happened to be the adjoining landowner. That view was shortly expressed by saying that the rights which were to be enforced in respect of this prescriptive easement were rights which would be properly enforced by an action of nuisance, which was to be distinguished from an action of trespass. An action of nuisance would not lie unless that which had occurred was a substantial interference with the plaintiff's comfortable or profitable occupation of his dwelling-house or warehouse or house of business, as the case might be. Mere proof that a given percentage of light had been taken away was not sufficient. In this particular case of *Kine v. Jolly* he agreed that there was good cause of action, but he differed in thinking that the remedy ought to be damages and not a mandatory injunction. There would be an enquiry as to damages. Lord Justice Romer differed, having come to the conclusion that the plaintiff had failed to prove that the defendant had committed a nuisance. He thought the plaintiff had still left sufficient light for the ordinary purposes for which the room was used. Lord Justice Cozens-Hardy agreed with the judgment of Lord Justice Vaughan Williams. With regard to the remedy, he thought that it was impossible to doubt that the tendency of the judgments of the noble Lords was to indicate that the Court ought to be less free than formerly in granting injunctions in actions for the obstruction of light.

Employers' Regulations: A Test Case.—At the South-West London Police Court last week Messrs. F. & H. F. Higg, builders, of Loughborough Junction, were summoned by two of their bricklayers for money deducted from their wages. Counsel appeared on both sides, and the case was treated as a test one, involving a principle of no little importance. The defendants, with a view of checking their workmen, instituted a system by which each man was required as he passed into the works to take a ticket identified by a number, and to place it in a box for reference. The defendants held that upon any neglect on the part of their employees to observe in the full these conditions they forfeited all claims unless they reported themselves at once to the responsible official. There was no attempt by the defendants to deny that the complainants actually worked; but as they failed to observe the rules and regulations payment was withheld. The magistrate thought it unreasonable to refuse payment when work was done. He therefore made an order for payment of the amounts claimed, with costs.



A NOVEL METHOD OF ROOFING A CHURCH.

THE church of St. John the Baptist, Corstorphine, is situated in one of the most interesting districts near Edinburgh, and was built by Sir John Forrester in the year 1429. It occupies the site, or, more properly, is a completion and enlargement of an earlier church also dedicated to St. John the Baptist and built by one of the Forrester family in 1380. It is one of the most picturesque and interesting old churches in Scotland, somewhat plain in design, the period of the Decorated Gothic predominating. Billings, in his "Antiquities," says: "It is in the form of a cross with an additional transept on one of the sides; a portion of the roof is still covered with old grey flagstones; a small square belfry tower at the west end is surmounted by a short octagonal spire, the ornate string-mouldings on which suggest an idea of the papal tiara." Some time ago it was observed that the roofs were decaying, and it was suggested that new roofs might be constructed with reinforced concrete. This has now been done. The method of construction was very novel. It is shown by the photographic illustrations on this page. There are first moulded ribs, arched, and between these ribs Granolithic



slabs 12in. wide are laid in, forming the ceiling. On top is reinforced Granolithic concrete, and to preserve the appearance of the church as it was originally, Granolithic slates have been made to harmonize with the original stone slates. They measure about 6ft. by 2ft. and weigh about 7 cwt. each, and when complete one cannot tell the difference between them and stone. This work has been carried out by Messrs. Stuart's Granolithic Stone Co., Ltd., of Millwall, E.

Choisy's Researches in Ancient Building Construction.

THESE were the subject of a paper which Prof. Capper, of Manchester University, read before the Leeds and Yorkshire Architectural Society last Thursday. He said that Choisy's researches into ancient Egyptian building construction followed his previous detailed studies, along similar lines, of Roman and Byzantine work, extending over a period of more than thirty years. Though not apparently the result of prolonged residence, and suffering from a curious ignorance of much recent work on Egypt and new data so derived, Choisy's researches made undoubtedly an epoch-making study, presenting some well-known facts in altogether new relationships and giving us daring and



reasoned solutions for many problems hitherto apparently insoluble even to experienced Egyptologists. As one of the most important of these solutions of long-standing enigmas, Prof. Capper gave in detail, with lantern illustrations from Choisy's book, the minute study of Egyptian brick walls, built with undulating bedding, a puzzle that had hitherto baffled every enquirer. As demonstrated by Choisy, these curious walls, which occur on a large scale at Karnak, Abydos, El Kab, Philæ, and elsewhere, are the logical outcome of Egyptian crude-brick building on sloping sites, given the scanty foundations possible in Egyptian soil, where the walls are liable to attack by the waters of the Nile. Similarly, Choisy, by a single illuminating paragraph, accounts for the well-known bench on the sides of the ascending gallery in the Great Pyramid, admittedly unexplained in Prof. Flinders Petrie's classical book on Gizeh. Prof. Capper gave an account of Choisy's explanation of the transport of material, whether in the enormous blocks of obelisk or colossal statue, or of the materials of more moderate dimensions used in ordinary building, and of his very ingenious demonstration of the use of sand for the nice adjustment of the great blocks in position.

R.I.B.A.

The By-laws.

A MEETING of the Royal Institute of British Architects was held last Monday evening, Mr. John Belcher presiding. Mr. Lacy W. Ridge read a paper entitled "Building By-laws, specially in Rural Districts."

Dealing with the main grounds of objections to the rural by-laws, Mr. Ridge said that primarily and chiefly they were an interference with the liberty of the subject out of all proportion to the necessities of the case or the good done by them. Again, the whole scheme was founded on the fallacy that in every district there were a large number of fit persons able and willing to serve on local administrative bodies, with no axes to grind, with plenty of time on their hands and capable *inter alia* of drawing up a code of workable building by-laws. Another objection to the system was its unnecessary clumsiness. This was illustrated more particularly by the requirement of the deposit of drawings, and that no building could be begun without the previous approval of the local authority. Things in themselves manifestly of no importance had to be complied with to save the face of the by-law. It was important to realize the proper limits of legislation. It was not for the law as a fairy grandmother to lay down in such a case as this that which was desirable or comfortable or even economical or good building, but only that which the public safety demands should be enacted and enforced by officials appointed for the public and paid at the public expense.

Mr. Ridge proceeded to submit a rough draft of by-laws which he considered would suffice for the general regulation of building so far as the public interest was concerned in ordinary rural districts. These proposals dealt with (a) notice to the local authority of the kind of building intended to be erected; (b) width of road; (c) the provision of open space for purposes of light and ventilation; (d) damp layer and course—being a shortened form of by-laws 3 and 4 of the Local Government's Model of 1903. The draft also contained regulations relating to sanitary arrangements; (e) lobby to closets; (f) privy; (g) soil-pipes and wastes; (h) disposal of sewage.

Speaking of the disposal of sewage, Mr. Ridge asked: Have we not somewhat recklessly admitted the system of removing by water carriage away from our houses matter which ought to have been returned to the land? Is not our wrong-doing constantly finding us out both in the smaller cases which we architects have to treat and in the larger problems involved in the disposal of the sewage of our cities?

One other subject, (i) party-walls, not included in the Model Rural By-laws of 1903, should, Mr. Ridge considered, most certainly be added and be of universal application. The efficiency of the party-wall on small buildings for preventing the spread of fire was manifest. The Royal Institute had submitted to the Local Government Board a carefully drawn clause on the subject, but it was neglected in the New Model in favour apparently of provisions as to the sizes of windows and heights of storeys, which seemed to assume that the proposed buildings were to be carried out by lunatics. The Institute did not suggest that party-walls should be carried through the roof in small buildings, while in warehouses it suggested increased height, as in the London Building Act.

The by-laws proposed, Mr. Ridge considered, might be made universal in this country without oppression or inconvenience to the public. The system required no submission of drawings, no assent before build-

ing was to be given or withheld by any local authority, and the points were so little technical that such supervision as was needed could be given by any man who was fit to be appointed as an inspector at all. When the local authority furnished sewers for the use of its district a new stage was reached. Plans showing the drains needed must be submitted, and the works to be executed agreed to as a condition precedent to having the use of the sewers. The author counselled the local authority and their officers to co-operate with architects in doing the best for the buildings under the special circumstances of each case, rather than regard their by-laws as the laws of the Medes and Persians, however useless and inapplicable they might be.

Nothing, however, should be done to diminish the power of local authorities to deal with dangerous structures or places unfit for human habitation. On the other hand, it should be distinctly understood that these powers might be extended to deal with new buildings, should necessity arise.

Mr. Gibson, whose paper was entitled "Architectural Design and the London Building Act," said that the Building Act of 1894 was probably to the majority of London architects a series of regulations with which the artistic spirit was continually in conflict. The objects to be attained by a Building Act for such a city as London were twofold: first, in all matters relating to the construction of buildings it must contain such provisions as are necessary for the safety, health and well-being of the bodies of the inhabitants, and in the arrangement and design of streets ample facilities for the carrying on of their daily work; while, secondly, its regulations should be such as would encourage the mental growth of the people by providing an environment likely to stimulate thought and invention.

As regards the primary object—viz., the safety, health and bodily well-being of the inhabitants—generally speaking this had already been attained by the London Building Act. As regards the second, the design and arrangement of streets to afford ample facilities for the carrying on of our daily work, he thought the Act was not wholly inadequate, but had not even touched the fringe of the subject. This was amply proved by the constitution of a Royal Commission on the Traffic of London Streets. In the personnel of that Commission it was rather amusing to find that all architects had been ignored; and, as far as he knew, no architect had appeared before it to express any views on the laying-out and design of London streets, yet if Sir Christopher Wren's scheme for laying-out the new streets of London after the Great Fire had been carried into effect, it is very probable there would have been no need for the present Royal Commission on Traffic, and Sir Christopher Wren was only an architect and surveyor.

The author went on to compare the widths of important thoroughfares in London with those of Continental and American cities, and thought there would be general agreement with him that any amended Act should authorize the Council to provide for streets up to 100 ft. in width, if the inadequacies of the present were to be obviated in the future.

The author suggested the following as a schedule of maximum heights for buildings for streets within a radius of $1\frac{1}{2}$ miles of St. Paul's Cathedral:—

Width of Street.	Ratio of Height of Buildings to Width of Street.	Approximate Lowest Buildings.	Approximate Highest Buildings.
ft.		ft.	ft.
40 to 60	1'000	40	60
60 to 80	1'125	67	90
80 to 100	1'250	100	125

For streets outside the $1\frac{1}{2}$ miles radius from St. Paul's Cathedral and within a 3 miles

radius the heights should be equal to the widths of the streets, while outside the 3 miles radius the heights should be less than the widths of the streets, with a maximum height of '75 of the width for streets of 100 ft. wide.

Another point is the provision of air-spaces to buildings, more particularly on corner sites in London, where by section 41, sub-section 4, the height of the building is limited to 30 ft. upon such part of the space at the rear of the building as the Council may think fit.

Coming to the minor details of the Act which bear upon the design of buildings, the author dealt with the regulation governing the areas of openings and recesses in external walls. Section 54, he thought, was not properly drawn, even for a plain wall with openings and recesses in it, and as a regulation governing the whole subject of the relative areas of solids and voids in external walls of varied design and construction it was wholly inadequate.

The projection of cornices is a matter of very considerable importance in architectural design: the arbitrary limitation to 2 ft. 6 in. met with wholesale disapproval. In streets of 50 ft. width and over the projection of cornices, balconies, oriel and bay windows should have fixed ratios to the width of street, and their erection permitted without having to make special application to the Council.

Some provision should also be made for overhanging eaves and verges.

As regards the regulation governing shop-fronts, it would be a step in the direction of sober and logical design if it were made impossible to erect huge sheets of glass on ground and first floors.

Mr. Gibson concluded by referring to three matters which he claimed to be of grave public importance:—

First, the lack of any provision in the present Act for the use of protected steel construction in buildings. Considering the advantages to be obtained by its adoption, the saving in floor-space, the important bearing it had on the areas of support, the difference its proper use would make on the proportion of solids and voids in external wall design, it was greatly to be regretted that its adoption as a building material was not foreseen and provided for. Buildings were constructionally erected in this material and then the external and other walls built around the steel in the same huge masses of brick and stonework as were necessary for buildings erected of the latter materials only. Practically the whole advantages of steel construction were nullified, and enormous masses of materials and labour absolutely wasted.

Secondly, he protested against the exemption of certain buildings of railway, canal and dock companies from the operation of clauses 6 and 7, regulating matters of construction and designs. One would only think with indignation of such atrocious structures as Broad Street, London Bridge, Ludgate Hill and Victoria Stations, to mention a few examples of the ill-doing of these private companies.

The third point of public importance was the great desirability of all district surveyors being practising architects. Nothing could be more inimical to the interests of the public, to the growth of architecture, to the beautifying of our streets, than to have as interpreters and administrators of a complex Building Act persons who, although highly skilled in technical knowledge and masters of routine, were inexperienced in the erection of buildings. He commended to the consideration of all district surveyors the second section of the Building Laws of New York viz., "This ordinance is hereby declared to be remedial, and is to be construed liberally, to secure the beneficial interests and purposes thereof."

A discussion which began on the papers was adjourned till January 9th.

NOTES ON BRICK AND TILE MAKING.*

By JOSEPH JOPLING, F.S.I.

THERE are between four and five thousand brick and tile works in the Kingdom, employing a large number of hands and a huge amount of capital, much of the latter I regret to say unproductive because useless where it is, the direct result of errors in locating the works, selecting the site, plant, machines, kilns, &c., or maybe of adopting an unsuitable process or method of working.

Stock Bricks, or London Stocks.

This description is, as a rule, given to hand-made clamp-burned bricks, although large quantities not called stocks are made in exactly the same way, in a mould on a stock, but are kiln-burned. We may therefore take it that as a rule a stock brick is clamp-burned.

The method of production is briefly as follows:—The brick-earth or clay is dug in winter and curfed up to let the weather get at it. Some of the earth is washed in a mill, screened, elevated, conveyed by wooden chutes or perhaps pumped through iron pipes and delivered on the top of that already put up.

Chalk in varying proportions is also washed into slurry, and added. When the water has been run off, ashes (called soil) are added, all in perfectly regular layers of even thickness. The actual making lasts through the fine weather of late spring, summer and early autumn, about six months, according to the weather, and is conducted as follows:—

The temperer breaks into the back, or heap of prepared earth, cuts down the layers of material already referred to into a heap, and wets, mixes or tempers it. It is then taken to the pugmills by tram or barrows and pugged. The pugmills are so arranged that the pugged dirt is delivered to the moulding tables, and from the moulder to the hack ground, with the least possible labour. At the moulding table the moulder and his assistant, the walk flatter, takes it in hand, and the clot or walk of clay for each brick having been flatted or worked roughly into shape by the walk flatter, the moulder moulds the brick, places it upon a pallet board, and then on to the page or direct on to the off-bearing barrow. The off-bearer wheels the bricks to the drying ground, and hacks them up to dry; they are in due course skintled, and when dry wheeled on a crowded barrow to the clamp, set and burned. When burned sufficiently, the clamp is broken into and the bricks sorted and loaded or stacked, as the case may be.

Some stock bricks are moulded five or six at a time (instead of moulding by hand) by means of a combined pugging and moulding machine, all the other operations being the same, but in this case the material has to be somewhat softer, and consequently difficult to pile on the hacks, and taking longer to dry.

The product of a clamp varies a great deal, and the bricks are called stocks, hard, yellow, bright and washed stocks, shippers, grizzles, place, shuffs and burn-overs, the last-named being those under-burned and to be burned over again. All of these vary in value, although they have cost the same to produce. Much depends upon the burner who manipulates the draught by means of clamp-boards.

The fuel consists of the ashes or soil contained in the body of the brick itself, and breeze in layers, between the bricks, at the lower part of the clamp. In the ordinary way all the bricks in a clamp, except shuffs, should stand the weather, although place bricks are generally used for internal work.

A well-made, properly burned stock is one of the best all-round bricks you can use, and I, for one, am sorry that this system is being extinguished; but it is practically impossible to burn a clamp with the usual fuel without giving off fumes that are very objectionable, if not injurious to health, and so far I have not been able to discover anything to take the place of the ashes satisfactorily.

Some of the very finest examples of brickwork existing, both as regards appearance and durability, are of stocks or clamp-burned bricks.

Plastic, Hand-moulded, Kiln-burned Bricks.

These bricks, produced very much on the same lines as the stock brick except that they are burned in kilns instead of clamps, comprise the highest quality of bricks we have at command. The material is or should be dealt with as before described, except of course that in the case of reds no chalk is added, for lime in any form is fatal to a good red colour. Ashes are of course not used, and sand is employed for mixing with the clay and for shading the washed earth when drying in the washbacks. For buffs or white bricks, sand from the river is needed. They are moulded in the same way as stocks, but more carefully, and in wooden moulds instead of steel, and the drying, whether in the open or in sheds or dryers, needs careful watching. When dry they are burned in kilns, with coal as fuel. Some are pressed, this being usually done in the sheds with portable presses, when the brick is leather dry. Ornamental bricks, or odd stuff, are moulded in box moulds, not on a loose stock. The product consists of various qualities and shades of red, buff, white, &c., according to the material used, and varying also with the degree of heat applied in burning. From the quality point of view we get the best in this class, and I personally prefer, so far as appearance goes, a sand-faced brick to one with a smooth face.

Efforts have been made, with considerable success, to supersede hand-moulding by using moulding machines for high-class facing bricks, in order to avoid the irregular application of moulding sand, and yet turn out a sand-faced brick. Some of these machines are worked by wheel or lever, others are driven by power. The cracks and flaws in this class of brick are usually the result of carelessness on the part of the moulder in preparing the clot or cleaning his mould, and there is great difficulty in overcoming this, for the liberal use of sand lightens the moulder's work. Cutters and rubbers, as well as odd stuff, require great care throughout, and in some cases the whole of the material is washed and carefully screened.

Plastic, hand-made, kiln-burned bricks are probably the most profitable to the maker, their extra value being much in excess of the extra cost.

Plastic, Machine-made, Kiln-burned Bricks.

An enormous quantity of excellent bricks are produced at a moderate cost by this system; and in view of the fact that clamp-burning has fallen into disrepute upon ordinary sanitary grounds, it is my opinion that the plastic, machine-made, kiln-burned brick is the common brick of the future, whilst a goodly proportion of the total would be excellent facing bricks.

Extra care in handling and pressing will (apart from the sand-face appearance, which of course is a matter of taste) give results in quality and colour equal to the hand-made bricks. For all general purposes they are strong and hard, if properly burned will stand any weather and any strain that can be put upon them in practice, and, what is more, can be produced at a low price.

The method of production is to dig the material, sometimes to weather it, more often to convey it direct from the face by barrow or tramway to the machines, and

having machined it in whatever way one's judgment or experience dictates a stream is expressed through a die on to a cutting-off table, where it is cut by wires into bricks. These are conveyed by barrows or on pallets and cars to perhaps an open drying ground, but preferably to a drying-shed or dryer, and there dried. If dealt with in a tunnel or similar dryer, they remain on the cars which travel on rails from the machines to the kilns. If partly dried in a shed they are racked up, then pressed or trimmed, and afterwards passed through the dryer, but this applies more particularly to pressed facings and ornamental bricks.

If the clay is very strong, that made into common bricks may have a small percentage of coal dust incorporated in the body of the brick, but this requires great care and is of doubtful advantage.

Dry or Semi-dry Machine-made, Kiln-burned Bricks.

In this system you have the acme of cheapness or, rather, low cost. Makers of this class of bricks and of the plant for producing them call them by all sorts of names, such as dry process, semi-dry, semi-plastic, stiff plastic, &c., but it all means the same thing, that is to say, it describes a brick in the manufacture of which the object in view is to eliminate water as far as possible and thus save the expense of drying, depending upon enormous pressure and the burning to so consolidate the various constituents as to make the brick homogeneous; but actual results in this case fall short of theory, according to the material used and the way it is handled.

The system is as follows:—The material is dug and kept as dry as possible (if too damp it is dried in sheds just as bricks are dried). It is then worked by pans or disintegrators into granular form, screened, elevated and conveyed to the moulding machines or presses, thence direct to the kilns, where it is burned with coal fuel. The product is good in appearance, and is much in favour as a common building brick, its very low price being a great inducement for its use.

This class of brick has been much improved of late. But, in my opinion, these bricks, while most useful for filling in or backing external walls above the damp-course, and for all internal work (especially if not to be plastered), are not suitable for external work, foundations or chimneys, and should certainly never be used for arches.

The outer skin is intensely hard and dense, but the same degree of density throughout the brick cannot be transmitted by pressure, and the water contained in the brick is forced through the dense skin by the burning causing minute cracks. Through these cracks the weather operates, the outer skin comes away, and this is soon followed by disintegration of the body of the brick.

Various other Bricks.

There are of course many other special kinds of bricks, but with the limited time at my disposal I can do little more than merely mention them. Shortly, it may be said that all are made very much on the same lines, but in every case the details and methods vary considerably. When I say on the same lines, I refer to the plastic, machine-made, kiln-burnt system.

Blue bricks from the Staffordshire district have a great reputation for heavy work, paving and many other purposes; but there are the real blue bricks; the so-called blue bricks are only blue outside by reason of their being moulded in manganese or like material, the body of the brick being a dull red and softer than a genuine blue brick.

For strength and durability, apart from appearance, blue bricks cannot be beaten, but by reason of the heavy firing they undergo, and more particularly if pressed, the outer skin is dense and smooth; hence they are not desirable for arches. The hard smooth skin

* Extracts from a paper read before the Surveyors' Institution on December 12th, 1904.

prevents them from adhering to the mortar or cement, no matter how good it may be.

Firebricks.

A firebrick is one that will stand the application of more or less intense heat without undue waste, contraction or expansion. Suitable material is found at Leeds, Stourbridge and Newcastle, and in Scotland, Wales, the West of England and many other places; while at least in one place in the South of England firebricks have for years been produced that give excellent results at moderate temperatures in gasworks, boiler flues and the like. Firebricks need not necessarily be hard. Some of the best are comparatively soft and none very good-looking.

Bricks from Shale.

As an illustration of what may be termed special circumstances attending brickmaking, I may mention bricks from shale. Vast quantities of such material are at hand wherever coal is mined, and the following typical case would apply to all. On a large colliery property in Yorkshire enormous quantities of shale had been drawn from the pits and deposited on the surface, covering acres of ground. It makes a very good hard common brick, much in local demand, and utilized thus has become valuable to all concerned. The shale having been handled a good many times and exposed to the weather, was well broken down, and of course there was a fine face above ground-level, so the working was easy. It was granulated, mixed, wetted, pugged and wire-cut into bricks, dried in sheds and burned in down-draught intermittent kilns. The lessee paid £20 a year surface rent and 6d. per 1,000 royalty, coals being cheap. The tenant did very well on an output of ten millions per year, and the owner got £250 per year royalty, besides the advantage of having the land cleared.

Other special Bricks, Tiles, &c.

I had intended to deal with glazed and enamelled bricks, salt-glazed ware, art, pavement and encaustic tiles, pipes, &c., but, to do them justice, each variety would need a paper to itself. In the production of such goods I need hardly say that still greater care and skill are needed, besides a very considerable capital, and again I would advise that these things must not be held too cheaply, for the work is not nearly so easy as it looks. Take, for example, glazed bricks; good glazed bricks are in ever-increasing demand, but in different qualities are not wanted at all. We are often told that at certain places material can be got that will make glazed bricks. Perhaps it will; but many things are physically possible though commercially impracticable.

❧ If it costs £1 is. to produce something worth £1, there is nothing in it. When you are possessed of a suitable material for the body of the brick, you have to prepare a glaze and slips that will give the desired results and stand the same temperature. This means experiments, often costly and uncertain. I have sometimes succeeded promptly at an outlay of a few hundred pounds, but it may just as likely cost thousands. Receipts for glazes, &c., offered from time to time, are not in my experience of much use, for those perfectly good at one place are useless at another.

A Standard Size for Bricks.

❧ Considerable attention has been given of late years to this question. Meetings have been held, and members of this Institution, among others, have given time and thought to the subject, but progress is slow and is I think likely to be so. At one meeting I expressed the opinion that, to bring about a standard size, architects, engineers and surveyors, in whose hands lies the power of specifying what they desire, should fix upon a standard size and specify it. The brick-makers would very soon supply what was specified. Since then a standard size has been decided upon, and that is about as far as we have got.

There is no doubt it would be desirable to have one size applicable to the whole country, but custom has fixed the size in the Midlands and the North far in excess of that in vogue in the South; and it will take time to bring the conflicting ideas into line. There is little or no mechanical difficulty, and we can all help; but you will not, I think, get much help from the brickmakers, for there seems no unity of purpose among them, each individual or firm playing his own game and cutting against his neighbour in the most unreasoning manner.

When you specify that the bricks shall be of standard size, it ought to be clearly defined what deviation will be permissible before the bricks (otherwise perfect) can be rejected as not of standard size. Unless this is done hardship will result, for the rejected bricks, however good, would at once become of less value on the market, apart from the expenses attending rejection. This is all the more important because in spite of all that is said by patentees and others regarding kilns, dryers and machines, and by the competing manufacturers themselves, the fact remains that, no matter by what plant or process produced or in what kind of kiln they are burnt, there is a variation in the finished size.

Testing Bricks.

Many manufacturers make a strong point of their certificates giving results of crushing tests, &c. I am afraid I do not attach much importance to these—not that they are not genuine and correct, but they seem to me almost irrelevant. It is difficult to conceive in practice a properly-burnt brick of any kind in a position where it would be crushed by the superincumbent load. I have never seen such a thing. Of course we have all seen cases where, through negligence, odd under-burned bricks have been used which have had to be replaced, but this does not apply.

If by way of illustration it is estimated that the maximum pressure would be 1 ton on the sq. ft. and you use bricks that you know will carry 10 tons, why be influenced by a certificate setting forth that certain bricks will carry 30 tons? There is no advantage whatever.

Among other tests is a rattling test. This I cannot understand. We try to avoid rattling bricks; and bricks are made to build with, not to be rattled, and no one would say they are earthquake proof. I presume the idea was to note the effect of the rattling on the arris of the brick; if so, would it not be better to watch the effect of the handling they would receive in actual practice?

Tiles and Pottery.

Tile-making is an important branch of the clay-working industry, and the demand for tiles is increasing.

In the manufacture of tiles, the processes, except in a few details, are much the same as in brick-making. Of course, mild, sandy brick-earth will not make tiles. The bulk of those on the market are machine-made and pressed, but there is still a demand for hand-made sand-faced tiles, which, although thicker and less regular in shape, are preferred by many for their better appearance. Ornamental, hip, valley, ridge and other tiles are of course used with the plain roofing tiles, and are made from the same kind of material, the majority by machine (hand or steam power), while some of them, together with finials and such like, are produced by hand.

Pottery for building, domestic, garden and ornamental purposes is another branch. A plastic clay, tough and elastic, is needed, and the common London clay makes very good ordinary pottery. The preparation of the clay needs more care than for bricks, or even tiles, but how this should be done depends entirely upon the clay itself and what form or class of pottery is to be produced. Drying is effected on pallets, racks or shelves in sheds artificially heated. There

are many ways of doing this, but I have found the small-bore hot-water system the most easily controlled and economical, requiring practically no attention except to the furnace, and that but little. The burning is generally done in intermittent kilns of the circular down-draught pipe. Common goods are set open to the fire, the better class in seggars, and the closer the goods can be nested or packed together, consistent with a proper draught, the better they will be burned and the less fuel will be used.

Starting new Works.

Much depends on how a place is started, and one cannot be too careful. In selecting or considering a proposed site one should know if there is a sufficient quantity of material easily get-at-able of a character that admits of its being manufactured without undue cost into a product that can be sold at a price that will bring a fair profit on an average of good and bad times. This must be ascertained by practical experiments conducted with care, and if need be by analysing the various deposits or strata. A regards quantity, make a block plan, stake out position of trial holes, and mark them on the plan with a number for identification. The holes may be dug out, though I prefer boring. One can then draw the cores, measure each stratum, and box them with a reference number to correspond with the plan, and so have an accurate record for present and future use.

Having got out samples of all the deposits or strata it is proposed to use, the same should be made into trial bricks, &c. (varying the mixtures and methods as experience may suggest), and carefully burned. This should be done by someone whose interests will not clash with one's own if the works are started, and whose remuneration or employment or orders for plant, &c., will not depend upon the success of the experiments.

It is necessary to have the trial samples distinctly marked, and to see that one gets a reliable detailed report as to how the material was mixed and manipulated from start to finish. It is possible to produce a decent brick from almost any earth, but one wants to know if it is practicable to do so at a profit. If the practical trials bring about unexpected results, the material should be analyzed, for it is quite possible for a small quantity of some foreign element to upset one's calculations, and if such exists it can often be eliminated or neutralized.

The maps of the Geological Survey are excellent guides in a general sense, but each field often varies and it is unwise to assume anything. I have known some bitter disappointments through taking things for granted.

Periods of adversity and prosperity attend this as all other trades, and the usual plan is to start new works in all directions while the boom is on, and when the slump comes, *finale!* In fact, it often happens that time is wasted in starting and the slump arrives before any profits are made, and then, unless there is capital to tide over with, the start is followed very soon by the finish. The best plan is to start when trade is bad, for prices are lower, and you can plan, equip and start the works and get all in order ready to take advantage of the better times.

If you are about to purchase freehold, see that the price is reasonable and also, among other things, that there are no oppressive restrictions, that any material you may need for adding to that on the site can be got at a reasonable cost, that you are not likely to cause a nuisance, that there is a good water supply, that the land is not likely to be flooded and is also capable of being drained, that coals can be put alongside the kilns at a fair price, that the goods when produced can be despatched at a reasonable expense, that labour is available, and so on.

(To be concluded.)

Electrical Notes.

New Electric Lamps.

As we have before pointed out in these columns, the carbon filament lamp is not destined to last either in its present state or even at all, for the simple reason that it cannot compete with the gas mantle in point of view of cost of illumination. Something more after the style of the Nernst lamp is wanted, but even the latter is not yet perfect, its high first cost and comparatively short life militating against its general use. Lamp manufacturers are now putting on the market high efficiency carbon filament lamps having a short coiled filament in a very large hemispherical bulb, the lower two-thirds of which are frosted. The whole is surmounted with an opal glass reflector, and the result is to give a very beautiful distribution of white light, which is obtained by overrunning the filament, whilst the large bulb prevents the quick blackening which would otherwise ensue. The general effect is somewhat like that of the Nernst lamp, whilst the efficiency approaches the latter's somewhat closely, and the first cost is favourable by comparison. The candle-power is about 30.

Bruce Peebles New Works.

The large new works recently erected at East Pilton, on the Tay, for the manufacture of electrical plant presents several features of interest, not only from the point of view of the general lay-out but also of the power supply. In all respects it may be said to be an example of a modern and up-to-date works for the purpose mentioned, and it is so arranged in consecutive departments that the raw material comes in at one end and the finished machines come out at the other. Speaking generally, the works consist of one span roof building 600ft. long by 160ft. wide, the centre being used for all the heavy

work, whilst the side bays and the galleries above them contain the shops for lighter work—the works, offices and the engine-room, &c. Being situated alongside the Caledonian Railway, rail access to the works is obtained at each end of the building. The arrangements for transporting the machinery in course of manufacture are very complete; they comprise two 15-ton cranes, each with three motors and two-speed gear, traversing the main shop; two 6-ton cranes in the side bays, also with three motors each; one 6-ton crane in the light erecting shop, with one motor; one 5-ton crane, with two motors; and a quantity of one motor 2-ton cranes as well as 2-ton jibs. Of course these cranes, having three motors, use these for travelling, traversing and lifting respectively, and are worked by a man in a travelling cage. As regards the power supply, this comprises a Belliss high-speed engine driving two 190-kilowatt dynamos; and one Browett & Lindley engine driving two 80-kilowatt dynamos. The current is generated at 230 volts at the terminals of each machine, these being arranged to feed into a three-wire system with 460 volts across the outers. All the lighting is done at 230 volts, and as far as the direct-current motor-supply is concerned both voltages are used. For three-phase current a motor generator is installed having an output of 120 kilowatts at 240 volts and 50 cycles. The direct-current supplies motors for most of the heavy work. All the large machines have their own motors, whilst several small countershafts are driven by separate motors and work the smaller tools by means of belting. These countershafts are driven themselves either by gearing or belting. Those in the galleries are placed on the floor level, supported by pedestals, and drive the separate small tool countershafts and speed cones by belting. The three-phase current supplies a number of induction motors,

which also drive some of the gallery countershafts. These several systems of supply and driving have been arranged chiefly to suit the special work required from the respective tools, but they also serve to show the firm's customers what may be done to meet their own requirements. The steam plant comprises a Stirling water-tube boiler capable of evaporating 8,360 lbs. of steam per hour, and a Babcock & Wilcox boiler for 5,200 lbs., whilst the condensing plant is of the Blake-Knowles coil type, capable of dealing with 5,000 lbs. of steam per hour. Other plant comprises a hydraulic plant for working five lifts and nine of the jib cranes; a pneumatic plant for the portable hammers, clippers, drills and for drawing water from a well; and a gas-producer plant for heating the annealing oven and the drying-out oven used for the armatures and coils. Some of the tools are quite special and most interesting, but we have no space for a description of these. The test room is specially laid out, and is supplied with five switchboards from which direct or three-phase current can be obtained [as required]. The whole undertaking may be said to comprise a model electric-plant works.

A.M.I.E.E.

New Companies.

ROWLEY STATION BRICK WORKS, LTD., Cakemore, Works. Capital: £10,000.

WARTON CRAG LIME AND STONE CO., LTD. Capital: £1,000.

EFFECTIVE SMOKE PREVENTER AND FUEL ECONOMIZER CO., LTD., 1, Broad Street Buildings, E.C. Capital: £6,000.

CREMER, GOODENOUGH & CO., LTD., brick manufacturers, &c., Preston Lee, near Faversham. Capital: £35,000.

HENRY FRUEND & CO., LTD., builders' merchants and wholesale ironmongers, 112 to 120, Tower Hamlets Road, Forest Gate. Capital: £15,000.

GEORGE EVANS & SONS LTD., timber importers and merchants, sawmill proprietors, &c., 761, Oldham Road, Newton Heath, Manchester. Capital: £30,000.

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Keystones.

Ruskin's House in Venice is to be marked with a tablet by the municipality.

At St. Anne's Cathedral, Leeds, the organ has been built by Messrs. Norman & Beard, of Norwich and London.

Society of Engineers.—Mr. Nicholas James West has been elected president for 1905, and Messrs. Maurice Wilson, Richard St. George Moore and Joseph William Wilson have been elected vice-presidents.

A Huge Railway Station at Leipzig has been commenced. It will cost £7,500,000 and will be nearly 1,000ft. long, with thirteen platforms. Seven steel arches will span the station, which is to be 140ft. wide.

Clelington U.F. New Church, Dundee.—The design for this church by Mr. T. M. Cappon, of Dundee, has been chosen in competition, though placed second by the assessor, who awarded the first place to Messrs. Thoms & Wilkie, Dundee.

Charing Cross Scheme.—The Bridges and Improvements Committees advise the London County Council not to give consideration to the proposal to move Charing Cross station to the south side of the river and build a new bridge.

War Correspondents' Memorial.—On January 14th Lord Roberts will unveil a memorial tablet in the crypt of St. Paul's Cathedral to the special correspondents who fell in the South African war. The tablet has been designed by Mr. W. Goscombe John, A.R.A.

The Tariffs of the Midland Hotels are given in a neat booklet which has just been issued from the chief office, Midland Grand Hotel, London. It contains illustrations of these hotels at Manchester, London, Liverpool, Leeds, Bradford, Derby, Morecambe and Heysham Tower.

No. 16, Portland Place, the residence of the late H.H. Princess Edward of Saxe-Weimar, has been acquired by Sir Thomas Henry Brooke-Hitching, and entirely re-decorated under the supervision of Mr. A. J. Hopkins, architect. The floors throughout the house have been covered with Mainzer's improved $\frac{1}{4}$ in. parquet, and the hall floor with marble "Arrolithic."

The new City Surveyor.—Mr. Sydney Perks, who has been elected to the office of City Surveyor, rendered vacant by the retirement of Mr. Andrew Murray, is a professional Associate of the Surveyors' Institution and a Fellow of the Royal Institute of British Architects.

New Municipal Buildings at West-houghton, Bolton, have been erected from designs by Messrs. Bradshaw & Gass, of Bolton. Messrs. William Townson & Sons, Ltd., of Bolton, were the general contractors. The hot water, heating and ventilation were done by Mr. J. W. Witter, of Bolton, and the telephones and preparation for electric lighting by Messrs. Pullin & Shore, Ltd. Messrs. Garnett, of Warrington, furnished the board-room.

Royal Waterloo Hospital for Children and Women.—The lady who has offered to endow a cot in this hospital on the condition that five others will come forward and do the same has found a worthy supporter in the executors of the late Mr. Arthur Ocran Crooke, who bequeathed £20,000 to the hospitals of London and Surrey. These executors have given 2,000 guineas, enabling two more beds to be endowed, and it is to be hoped that three more such generous donors will help this most-deserving charity in its good work for the suffering poor. The annual income of the Royal Waterloo Hospital is £763, a sum totally inadequate for its needs.

The Royal Exchange Assurance will pay an interim dividend of £4 per cent., free of income tax, on January 6th next.

New Science Buildings at King's School, Grantham, have been erected at a cost of £16,000.

A new L.C.C. Fire Station has been erected at a cost of £8,000 in High Street, Eltham.

A new Outpatients' Department at the Bradford Children's Hospital is being erected. Mr. James Ledingham is the architect.

Ulster Society of Architects.—At the annual general meeting held last week Mr. W. J. Gilliland was re-elected president.

An International Archaeological Congress at Athens will be held from April 6th to 13th next year. Two hundred delegates have already accepted invitations.

A new Chancel at Brighouse Parish Church has been built, at a cost of £4,000, from designs by Mr. Hodgson Fowler, of Durham. It is 35ft. by 21ft. by 36ft. in height.

Sir Lawrence Alma-Tadema, R.A., has promised to lend his model and sketches for "Coriolanus" to the Scenic Artists' Exhibition, which will be held in a Bond Street gallery in February next.

Liverpool's Memorial to Queen Victoria is approaching completion. Last week the executive committee inspected and formally accepted the statue from the sculptor, Mr. C. J. Allen. It is 14ft. 6ins. in height and weighs 7 tons.

Mr. Alfred Griffin, F.S.I., of 34, Coleman Street, has been appointed surveyor to the trustees of Morden College, Blackheath, from the beginning of next year, upon the retirement of Mr. Thomas Barnes-Williams, F.R.I.B.A., F.S.I.

Manchester Society of Architects.—The forty-first annual dinner was held on Friday evening last, Mr. J. W. Beaumont (president) occupying the chair. Mr. T. E. Collcutt replied for the R.I.B.A., and Mr. John Slater, Vice-Chancellor Hopkinson of Manchester University, Mr. E. Guy Dawber, Mr. Alfred Darbyshire, Mr. C. Rowley, Mr. John Ely and Mr. J. A. Gotch also spoke.

Competition for Wesleyan Church House, Westminster.—In accordance with the recommendation of Sir Aston Webb, R.A., the assessor in this competition, the following (9) will be invited to send in further designs for a final competition, each receiving an honorarium of 100 guineas:—Messrs. Crouch, Butler & Savage, Birmingham; Lanchester & Rickards, London; James S. Gibson, London; Cheston & Perkin, London; Waddington, Son & Dunkley, London; James A. Swan, Birmingham; E. Vincent Harris, London; William Flockhart, London; C. E. Mallows & A. W. S. Cross, London. 132 sets of sketch designs were submitted.

St. Mark's in Danger.—The committee appointed to watch over the condition of St. Mark's and take measures for the preservation of the great Basilica met last week to consider the report drawn up by Professor Manfredo Manfredi, the eminent architect, and Signor Luigi Marangoni, the engineer, who were charged with the task of making a thorough technical examination of the building and carrying out such repairs as they might find urgent. The committee approved a proposal contained in the report for a thorough study of the foundations. Professor Manfredi and Signor Marangoni stated that they had already had some important operations effected with a view to strengthening the edifice. Signor Boni, the noted expert, says there is no immediate danger for St. Mark's, but rational measures are necessary forthwith. The fault lies with the foundations; hitherto the repairs to the cathedral have been merely the concealment of the cracks.

The new Corn Exchange and Covered Market at Hull was opened last week. It is on the north side of Holy Trinity Church and has cost £10,000. Mr. Joseph H. Hirst, city architect, designed the building.

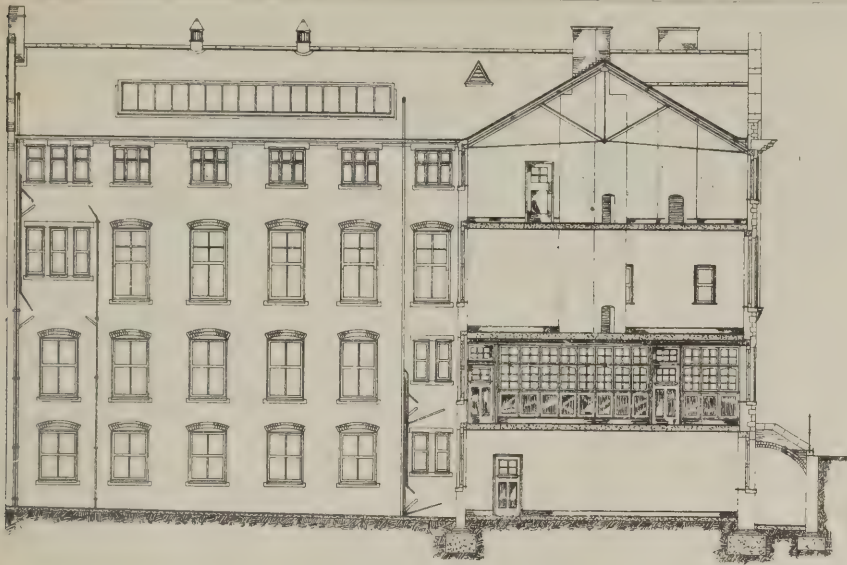
Obituary.

Mr. W. Mason, builder and contractor, of Haverhill, died recently in his seventy-first year.

Mr. J. A. McDonald, chief engineer of the Midland Railway Co., died on Sunday, aged 58. He succeeded Mr. Langley in 1890, and was engaged in all the more recent of the company's engineering projects.

Mr. Richard Mawson, the well-known Bradford architect, of the firm of Messrs. Mawson & Hudson, died in London recently after an operation. He was in his seventieth year, and was about to retire after being in practice as an architect for close upon fifty years. The firm was established as Lockwood & Mawson by the late Mr. H. F. Lockwood in association with the late Mr. William Mawson—an elder brother of Mr. Richard Mawson. The building of Saltaire—Sir Titus Salt's model village—was a work in which Mr. Lockwood was personally concerned, and it naturally brought Messrs. Lockwood & Mawson into considerable prominence. The firm are also represented by St. George's Hall, Bradford. Another large undertaking was the Bradford Town Hall, which fell to their share in the early 'seventies. In the competition the firm sent in two designs, one Classical and the other Gothic. The firm themselves were understood to favour the Classical design, but the prevailing taste was for Gothic architecture, and the adjudicators decided accordingly. Similarly, in open competition they had previously been successful in their designs for the Bradford Exchange, opened in 1867. In 1872 they were the architects for the Kirkgate Market, which led to the erection of a similar building in Dublin from Messrs. Lockwood & Mawson's designs. Amongst many other Bradford buildings by the same firm are the Bradford Workhouse, the Haslingden Workhouse, Horton Lane Chapel, Lightcliffe Congregational Chapel, and the warehouses of Milligan, Forbes & Co. and Law, Russell & Co. Outside Bradford perhaps one of the most notable buildings with which they were concerned was the City Temple, London, and they are also represented by the large block of shop property on Holborn Viaduct built for Wallis & Co. and the first Civil Service Stores built in London. They were in competition for the new Law Courts in London, and were the architects for Nottingham University College, while several of the banking establishments in Park Row, Leeds, were built from their designs. On the death of Mr. Lockwood the title of the firm became Mawson & Mawson, and on Mr. William Mawson's death it was changed to Mawson & Hudson.

Mr. William Dart, of the firm of Dart & Francis, contractors, Crediton, died suddenly on December 7th, aged 71. He carried out many important contracts in all parts of the kingdom, particularly in Devon, and had established a reputation for English oak joinery and church fittings, as well as for church restorations, having renovated upwards of fifty churches. Messrs. Dart & Francis are at present engaged in building the extensive new wing at the old Rougemont Castle, Exeter, for the Devon County Council, under Messrs. E. H. Harbottle & Son; also elaborate oak fittings for churches under Mr. W. D. Caroe, Messrs. Woodd & Ainslie, and other architects. The firm will be continued as formerly under the management of Mr. S. B. Francis in conjunction with the executors.



NEW PREMISES FOR MESSRS. NORTON AND GREGORY, CASTLE LANE, BUCKINGHAM GATE, S.W.
L. LITTLEWOOD AND O. MAHOMED, JOINT ARCHITECTS.

A PHOTO-PRINTING WORKS.

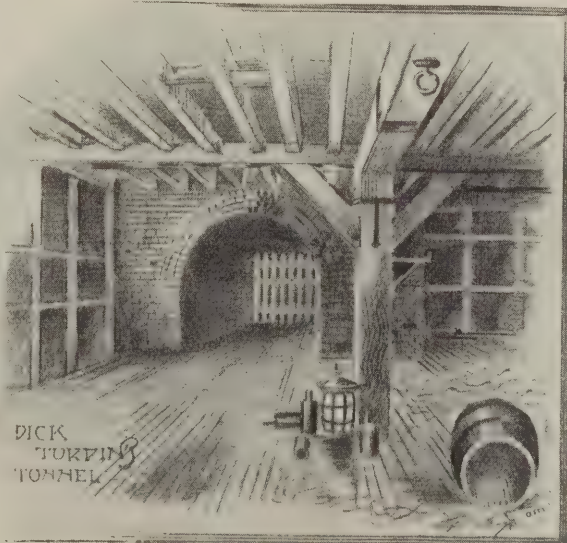
WE illustrate on this page the new premises which have been built for Messrs. Norton & Gregory in Castle Lane, Buckingham Gate, S.W. The site was formerly occupied by the old "Stag Inn," with which Dick Turpin is associated, and in this connection it is interesting to note that prior to the erection of the new building there was a mysterious tunnel beneath the inn, extending riverwards, and presumably a great convenience to smugglers. However, turning to the new premises we find everything designed and appointed to effect the prompt despatch of business. The offices are on the ground floor of the front block, the back being occupied by a spacious mounting and framing department, together with a stock-room for stationery, instruments and drawing-office requisites of every description. Ascending by the lift to the first floor, we come to the photo-printing department, which occupies the whole area of 60ft. frontage and 90ft. depth, comprising rooms for electric printing, developing, drying, cutting, examining and despatching—all fitted with up-to-date plant to economize time and labour. Above, on the second floor, is a large drawing-office, as well as laboratories and sensitizing rooms, the lithographic and "process" department, modelling shop and workshops: while in the basement are the caretaker's rooms, boiler and heating plant, &c., and additional suites of offices.

The premises are built of Fletton bricks, with Monk's Park stone for the ground-floor front, cornices, jambs and architraves, &c. The constructional steel-work—stanchions, girders, fireproof flooring and roof—was carried out by Messrs. Lindsay, Neale & Co., Ltd., and the ventilation of the developing and sensitizing room by Messrs. Robert Boyle & Son, this latter room being glazed with non-actinic glass. Internal walls are by the London Plate Walling Co., and the plastering is executed in Zarapite plaster, while the rooms where chemical vapours are developed are additionally treated with Marpedo enamel; the same rooms have been floored by the Val de Travers Asphalte Co., Ltd., to various falls and gulleys communicating by glazed pipes with the drains. Doulton sanitary

fittings and sinks have been specified throughout. The boiler and destructor have been installed by Messrs. Robert Dawson & Co., of Stalybridge; and the electric light is by Mr. Wightwick, of Forest Hill. The wrought-iron railings and arc-lamp bracket over the entrance and the gun-metal door furniture are from Mr. S. B. Goslin's foundry; the stoves by Messrs. Yates, Haywood & Co.; and lifts by Mr. Lucas, of Brockley. The spring-hinges on the swing entrance doors are the Stoyer Co.'s patent, the agency for which is held by Messrs. Norton & Gregory. The architects were Messrs. Littlewood & Mahomed, of 3a, Bank Buildings, Balham, and the builders Messrs. Lorden & Sons, Trinity Road, Upper Tooting, S.W.

With premises so complete Messrs. Norton & Gregory are able to carry on their photo-printing business in the most up-to-date manner. It is only four years since they occupied two small back rooms on the top floor of No. 3, Victoria Street, whence they had to move to larger premises in Westminster Palace Gardens in order to cope with an ever-increasing business, especially in their new "Black Line" process; so that this third removal to these large new premises marks them out as a firm whose work secures and holds very wide custom indeed.

A Japanese Tower has been constructed at a cost of £80,000 in the Royal park at Laeken, near Brussels, for the King of the Belgians. At the present moment six architects are working for his Majesty, including Mr. Arnold Mitchell, F.R.I.B.A.



Builders' Notes.

Reinforced Concrete.—One of the oldest French armoured concrete firms, M. Edmond Coignet, has opened a branch in London, thus adding one more name to the increasing list of contractors for this kind of construction in this country. M. Coignet obtained the highest awards for reinforced concrete at the Paris Exhibition of 1900, where he constructed the monumental waterworks known as the "Chateau d'Eau." Mr G. C. Workman is the agent for England, and his address is 43, Chancery Lane, W.C.

Incorporated British Institute of Certified Carpenters.—The annual report for the session 1904 states that this year more candidates have presented themselves for election than in any year since the founding of the Institute in 1890, the number enrolled being 32 as against 16 for the previous year; the total number now on the register is 130, not including honorary members. The report says that the time cannot be far distant when the Institute will be recognized as the legitimate body for awarding certificates in carpentry and joinery.

The Standardization of Water Pipes and Fittings has been agreed upon by manufacturers throughout the United Kingdom. The Worshipful Company of Plumbers are primarily responsible for the movement, which has now received the approval not only of engineers and architects, but of the Metropolitan Water Board. The Board of Trade, too, has given a sympathetic support to the movement, and it is understood that the Admiralty will adopt the standard sizes as soon as they are prepared. The matter has reached the present stage after various conferences in London, extending over several months. The scheme which has just been approved was prepared by a sub-committee consisting of Mr. S. G. Mason (managing director of Mason, Ltd., Birmingham, representing the manufacturers), Mr. H. D. Searles Wood (representing the architects), Mr. F. Griffiths, M.I.C. (Leicester) and Mr. John Knight (for the Plumbers' Company). The idea, briefly, is that all pipes and fittings, both lead and iron, shall be made to a standard size. All fittings will have to undergo a test of 400lbs. to the sq. in., and provision is made that ball valves shall in future be made of gunmetal. All new fittings and inventions will be inspected by a permanent committee before they are allowed to be generally used. It is estimated that the fittings of an ordinary house under the new system will not come to more than 4s. and larger houses 6s., and this is spread over the life of the fittings, which is about thirty years.

R.I.A.I.

Architects' Charges.

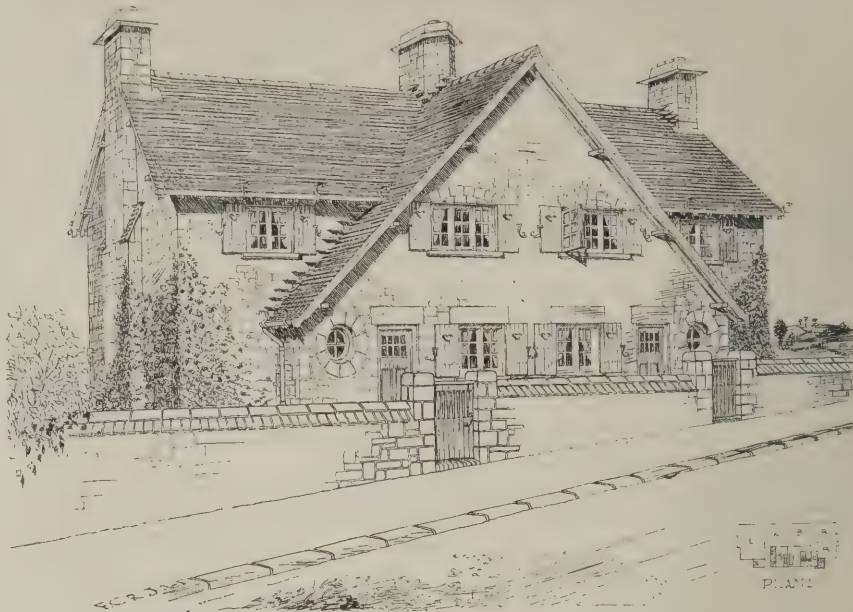
THE following have been elected as the council of the Royal Institute of the Architects of Ireland:—Mr. William M. Mitchell, R.H.A. (president), Mr. George G. Ashlin, Sir Thomas Drew, Mr. C. F. MacCarthy, Mr. George Sheridan, Mr. Frederick Batchelor, Mr. A. E. Murray, Mr. Arthur Hill, Mr. Charles A. Owen and Mr. W. Kaye Parry; Mr. Charles H. Ashworth, hon. treasurer; Mr. R. Caulfeild Orpen, hon. secretary; and Mr. James H. Webb as the representative of the Architectural Association of Ireland. The Ulster Society of Architects has not yet nominated its (2) representatives.

In the report of the council for the past year reference is made to a proposed alteration in the schedule of charges, to which attention was drawn by the Ulster Society of Architects. The amended section in the schedule as drafted by the Ulster Society is as follows:—

"Clause 4. When several distinct buildings, being repetitions of one design, are erected at the same time from a single specification and one set of drawings, and under one contract, the usual commission is charged on the cost of one such building and 2½ per cent. on the cost of the remainder of the buildings. Where variations of a slight character are made not involving an entirely different set of plans, a charge is made in addition varying according to the amount of trouble involved, but this arrangement does not apply to the re-duplication of parts in one building undertaking, unless such re-duplication is such as to permit of the drawing and specification prepared for one part serving entirely for the erection by contract of the other part, in which case the full commission is charged on the total cost."

"Clause 4A. Where buildings are of a very plain description, in the nature of warehouses, stores or shedding involving less than the usual trouble in design and drawing, and where no special construction has to be adopted to render them suitable for machinery or otherwise, a minimum charge of 3½ per cent. may be made, and in no case is any less charge to be made except under specially exceptional circumstances, the amount of which is to be regulated only on application to the council of the Ulster Society of Architects setting out fully the facts, in which case, if the council so decide, a further reduction may be made of the amount which it may consider fair under the circumstances."

The council of the R.I.A.I. deprecate any local variation from the Institute schedule which would destroy that uniformity which is its chief advantage, and, although fully appreciating the difficulty which the council of the Ulster Society have had to face for the protection of its members in Belfast and other northern towns of Ireland, where the conditions of practice are somewhat different from those found in other parts of Ireland, yet feel bound to express disapproval with any change tending to alter the recognized standard commission of 5 per cent.



These cottages are being erected for a lady who wishes to house her gardener and coachman away from her own residence. The cottages are built of local limestone and roofed with tiles. The plan has been largely determined by the available means of drainage. The w.c. and scullery had to be arranged on the road frontage, to drain into the sewer in the road, on account of the ground sloping considerably from front to back, this also necessitating a basement storey.

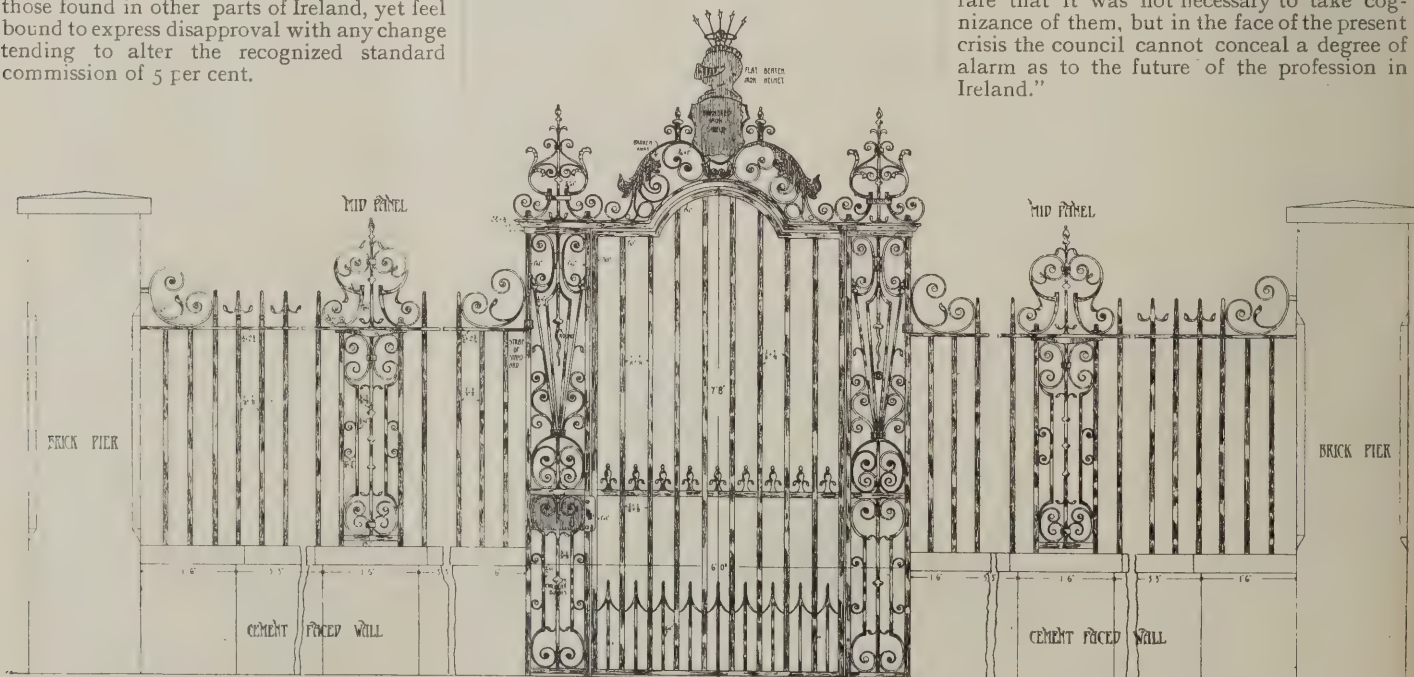
COTTAGES AT TORQUAY. JOHNSON AND WEBBER, ARCHITECTS.

In his presidential address Mr. Mitchell referred to this matter, observing that he did not think the Ulster Society had given sufficient consideration to what might be the effect of their action. "Their clients will naturally endeavour to have their buildings paid for on the lower scale, and it may be found somewhat difficult in some cases to determine under which rate they should be placed, especially as the interests of client and architect cannot be said to be identical. I greatly fear the alteration will be attended with some difficulty and friction, and I do not regard the proposal to submit certain cases to the arbitration of the council as being either a satisfactory or practicable arrangement. I consider it is dangerous to depart from such a generally accepted standard of

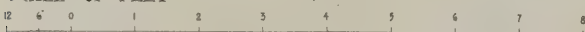
remuneration as the 5 per cent. commission unless very strong reasons indeed can be adduced for taking such a step. I greatly fear the tendency may be to lower the commission on all buildings whatsoever to the reduced scale. Such a result would be indeed deplorable, and would render the remedy worse than the disease."

Irish Architects for Irish Buildings.

The council express profound regret at the increasing tendency of public bodies, as well as private individuals, to bring over English and Scotch architects whenever occasion offers. "If a calculation is made at the rate of 5 per cent. on the total outlay on buildings erected (even within the radius of Dublin) during the last few years under architects other than Irish, the loss to the profession will be alarmingly manifest. In the past cases of such foreign importation were so comparatively rare that it was not necessary to take cognizance of them, but in the face of the present crisis the council cannot conceal a degree of alarm as to the future of the profession in Ireland."



SCALE OF FEET



This gate and railing, made of iron from the old Sussex mines, were erected in 1720, the design of both house and gate being attributed to Sir Christopher Wren. The gate is in a fairly good condition, and is one of the best examples of early eighteenth-century ironwork in the neighbourhood.

WROUGHT-IRON GATE AND RAILINGS, NO 13, NORTH SIDE, CLAPHAM COMMON, S.W. MEASURED AND DRAWN BY LIONEL M. PARR.

A CONCRETE RAILWAY VIADUCT.

At the meeting of the Institution of Civil Engineers held on December 13th a paper was read on the construction of a concrete railway viaduct at Cannington (on the Axminster and Lyme Regis Light Railway) by Mr. A. Wood-Hill, A.M.I.C.E., and Mr. E. D. Pain, student I.C.E. This viaduct consists of ten elliptical arches of 50ft. span, its total length being 600ft., width over spandrels 16ft., maximum height to rail-level 92ft. and gradient 1 in 80. It affords an example of the recent application of concrete to viaduct construction and to arches of somewhat large span. With the exception of the concrete blocks in the vertical faces of the arches, the work throughout is mass concrete. The geological strata are greensand and blue-lias clay. The foundations, originally designed for a pressure of $3\frac{1}{2}$ tons per sq. ft., were enlarged to give pressures ranging from $1\frac{1}{2}$ tons to 3 tons per sq. ft. The concrete used consisted of crushed flints and Portland cement, the crushing yielding sufficient grit to make the addition of sand unnecessary except in special cases. The concrete was hand-mixed, and for transporting this and other materials a cableway of 1,000ft. span was erected across the valley, the piers being built without scaffolding. The piers were carried up in rectangular lifts of diminishing size, instead of having a continuous batter, the lifts being 6ft. deep. The concrete was deposited in eleven wooden boxes of this depth, which were bolted up on the ground and hoisted into position. Two rows of corbels were built in the top lift of the piers to support the arch-centering. This consisted of four built ribs, the centre portion of which was tied by a framework in the form of a Warren girder, supported in the middle by raking struts from the lower row of corbels. The ribs, including the lattice-work, were set in one piece, and four tie-bolts were placed in the span to assist the piers in taking the thrust. The faces of the arches were built in concrete blocks, of which two similar ones on opposite sides of the viaduct were set simultaneously by a rail attachment to the cableway; and by adjusting the chains attaching the blocks the latter were suspended at the angles required by their position in the arch. The blocks were keyed in advance of the mass concrete in order that the adhesion of the latter to the toothing of the blocks might relieve the centres of some of the weight. Expansion joints were formed through the arches, spandrels and parapets, and are found effective in giving play for expansion and contraction and any slight movement due to settlement. In turning the arches, the centering, although apparently light, was found to be sufficiently rigid, and the setting was facilitated by the ribs being made in one piece. The settlement of the piers was for the most part fairly even, and, being adjusted as the work proceeded, did not affect the concrete; but the settlement of the west abutment and first pier was greater than elsewhere, and crushed the crown of the first arch. Two diaphragm walls were built in brickwork in cement in the third span, to enable it to act as an abutment, and concrete needles were built in the embankment between the first and second piers; the crushed portion of the first arch was cut out and made good in brickwork, and the parapets over this arch were completed.

Messrs. Wood-Hill and Pain believe this is the first instance where piers of a similar height have been built without scaffolding, and in which the centres of a 50ft. arch have been designed for setting in one piece.

At the end of their paper was given a schedule of results of tests of sample blocks made from materials used in the concrete for the viaduct.

Trade and Craft.

A "Gassteam" Radiator.

The Boston "Gassteam" radiator derives its name from the fact that it gives a steam heat from a gas-burner. It requires no separate boiler, pipes or chimney, and after lighting may be left to burn all day without any attention. It produces no smell and does not dry up or vitiate the atmosphere of an ordinarily ventilated room; the best proof of this being that it is used in offices, in private sitting-rooms, in bedrooms and surgical wards, and in conservatories, &c. It is very economical, having an ingenious contrivance whereby the steam in the radiator automatically controls the admission of gas and reduces the supply to the minimum quantity required to maintain a regular heat and to keep the pressure low. With gas at 3s. per 1,000 cub. ft. a room of ordinary size, say 2,000 cub. ft. contents, may be well warmed at a cost of 2d. per day of eight hours. The radiator is attractive in appearance, occupies very little space, and may be placed wherever a gas connection can be made, and on any kind of floor. It may be seen in operation at the offices of Messrs. Hendry & Pattison, Ltd., 11, Hill's Place, Oxford Street, from whom all particulars may be obtained.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending December 16th twenty-one failures in the building and timber trades in England and Wales were gazetted.

- G. A. BOWN, builder, Walthamstow. Adj. Dec. 7th.
G. SPURR, builder, Whiteley, Bury. Adj. Dec. 6th.
E. C. GOUGH, surveyor, Westminster. Adj. Dec. 10th.
S. ASHMOLE, builder, Ware. R.O. Dec. 6th.
W. MULHOLLAND, builder, Great Crosby. R.O. Dec. 7th.
B. HAYNES, builder, West Norwood and Croydon. R.O. Dec. 9th.
WATSON & HUNTINGTON, electricians, London. Adj. Dec. 9th.
DOWLAND & RICHARDS, builders, Parkstone. First meeting, Grand Hotel, Bournemouth, Dec. 21st, at 12.15. P.E., Poole Town Hall, Feb. 8th, at 11.30.
SUTTON & SONS, builders, Basingstoke. First meeting, O.R.'s, Southampton, Dec. 21st, at 3. P.E., The Castle, Southampton, Jan. 9th, at 11.
G. TAYLOR & CO., constructional engineers and girder makers, Manchester. R.O. Dec. 7th. P.E., Manchester C.C., Jan. 9th, at 10.
H. GOOD, brick and tile merchant and builder, Great Grimsby. P.E., Grimsby Town Hall, Jan. 5th, at 11.
H. BRAILSFORD & SONS, builders and contractors, Sutton-in-Ashfield. R.O. Dec. 5th. P.E., Nottingham C.C., Jan. 13th, at 12.
P. S. ARNOLD, engineer, Barnsley. First meeting, O.R.'s, Barnsley, Dec. 21st, at 10.15. P.E., Barnsley C.C., same date, at 10.30.
W. DARLEY, builder and contractor, Pontefract. First meeting, O.R.'s, Wakefield, Dec. 22nd, at 2.30. P.E., Wakefield C.C., Jan. 12th, at 11.
H. LEGGOTT & CO., architectural ironmongers, Bradford. R.O. Dec. 5th. First meeting, O.R.'s, Bradford, Dec. 23rd, at 11. P.E., Bradford C.C., Jan. 11th, at 10.

Coming Events.

Wednesday, December 21.

INSTITUTION OF CIVIL ENGINEERS.—Students' Visit to Messrs. Clowes' Printing Works, Duke Street, S.E.

BUILDERS' FOREMEN AND CLERKS OF WORKS' INSTITUTION.—Directors' Annual Meeting at 7 p.m. Members Meeting at 8 p.m.

Tuesday, January 3.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Mr. J. H. Pentland, R.H.A., on "The New Profession of Architectural Engineering," at 8 p.m.

Friday, January 6.

ARCHITECTURAL ASSOCIATION.—Mr. Alfred Cox on "Libraries," at 7.30 p.m.

Saturday, January 7.

INCORPORATED BRITISH INSTITUTE OF CERTIFIED CARPENTERS.—Meeting at Carpenters' Hall at 6 p.m. Mr. J. D. Manners on "A Visit to Chatham Naval Hospital."

New Schools in Crescent Road, Middlesbrough, are to be built from designs by Messrs. R. Lofthouse & Sons, of Middlesbrough, at a cost of £15,974.

Current Market Prices.

		FORAGE.		£	s.	d.	£	s.	d.
Beans	... ..	per qr.	1	14	0	2	0	0	
Clover, best	... ..	per load	3	15	0	4	2	6	
Hay, good	... ..	do.	3	10	0	3	15	0	
Sainfoin mixture	... ..	do.	3	10	0	3	17	6	
Straw	... ..	do.	1	12	0	2	0	0	

OILS AND PAINTS.

Castor Oil, French	... ..	per cwt.	1	0	5	—			
Colza Oil, English	... ..	do.	1	1	9	—			
Copperas	... ..	per ton	2	0	0	—			
Lard Oil	... ..	per cwt.	2	15	0	2	17	0	
Lead, white, ground, carbonate	... ..	per ton	16	0	0	—			
Do. red	... ..	do.	15	0	0	—			
Linseed Oil, barrels	... ..	per cwt.	0	15	7½	—			
Petroleum, American	... ..	per gal.	0	0	5½	—			
Do. Russian	... ..	do.	0	0	4½	—			
Pitch	... ..	per barrel	0	8	0	—			
Shellac, orange	... ..	per cwt.	10	7	0	—			
Soda, crystals	... ..	per ton	3	2	6	3	5	0	
Tallow, Town	... ..	per cwt.	1	5	0	1	5	6	
Tar, Stockholm	... ..	per barrel	1	3	6	—			
Turpentine	... ..	per cwt.	1	17	9	—			

METALS.

Copper, sheet, strong	... ..	per ton	79	0	0	—			
Iron, Staffs., bar	... ..	do.	5	17	6	8	0	0	
Do. Galvanized Corrugated sheet	... ..	do.	10	10	0	10	15	0	
Lead, pig, Soft Foreign	... ..	per ton	12	15	0	—			
Do. do. English common brands	... ..	do.	13	2	6	—			
Do. sheet English, glb. per sq. ft. and upwards	... ..	do.	14	0	0	—			
Do. pipe	... ..	do.	15	0	0	—			
Nails, cut clasp, 3in. to 6in.	... ..	do.	9	5	0	—			
Do. floor brads	... ..	do.	9	0	0	—			
Steel, Staffs., Girders and Angles	... ..	do.	5	10	0	6	0	0	
Do. do. Mild bars	... ..	do.	6	0	0	6	5	0	
Tin, Foreign	... ..	do.	135	15	0	136	5	0	
Do. English ingots	... ..	do.	133	0	0	138	0	0	
Zinc, sheets, Silesian	... ..	do.	28	0	0	—			
Do. do. Vieille Montaigne	... ..	do.	28	15	0	—			
Do. Spelter	... ..	do.	24	15	0	25	5	0	

TIMBER.
SOFT WOODS.

Whitewood, American, logs	... ..	per ft. cu.	0	1	3	0	1	6	
Do. do. planks and boards	... ..	do.	0	1	3	0	1	6	
Fir, Dantzic and Memel	... ..	per load	2	7	6	4	15	0	
Pine, Quebec, Yellow	... ..	do.	4	0	0	7	0	0	
Do. Pitch, American	... ..	do.	2	10	0	6	0	0	
Laths, log, Dantzic	... ..	per cu. fath.	4	0	0	6	0	0	
Deals, Uleaborg, Yellow, 4x12	... ..	per std.	6	15	0	—			
Do. do. 4x10	... ..	do.	7	5	0	—			
Do. do. 4x9	... ..	do.	8	10	0	—			
Do. Archangel, Yellow, 2nd, 4x11	... ..	do.	17	5	0	—			
Do. do. 3x11	... ..	do.	15	15	0	—			
Do. do. 3x9	... ..	do.	14	15	0	—			
Do. do. 3rd, 4x11	... ..	do.	13	0	0	—			
Do. St. Petersburg, White, 1st, 3x11	... ..	do.	11	0	0	—			
Do. do. 3x9	... ..	do.	10	0	0	—			
Do. do. 2nd, 3x11	... ..	do.	9	0	0	—			
Do. do. do. Unsorted, 3x11	... ..	do.	8	10	0	—			
Do. do. do. 2½x9	... ..	do.	8	10	0	—			
Do. do. do. 2½x8	... ..	do.	8	0	0	—			
Do. do. Yellow, 3rd, 2½x11	... ..	do.	8	5	0	—			
Do. do. do. Unsorted, 2½x7	... ..	do.	9	0	0	—			
Do. Kristinestad, Yell., Unsorted, 2½x7	... ..	do.	8	10	0	—			
Do. West Bay (N.S.), Spruce, 1st, 2nd & 3rd, 3x5	... ..	do.	6	0	0	—			
Do. Amburst (N.S.), Spruce, Unsorted, 3x9	... ..	do.	8	0	0	—			
Do. do. do. 3x8	... ..	do.	7	10	0	—			
Do. do. do. 3x7	... ..	do.	7	10	0	—			
Do. do. do. 3x6	... ..	do.	7	0	0	—			
Battens, all kinds	... ..	do.	5	15	0	9	10	0	
Flooring Boards in. prepared, 1st...	... ..	per square	0	8	9	0	9	9	
Do. 2nd	... ..	do.	0	8	3	0	9	0	
Do. 3rd, &c.	... ..	do.	0	7	0	0	8	6	

HARD WOODS.

Ash, Quebec	... ..	per load	4	10	0	7	15	0	
Birch, New Brunswick	... ..	do.	2	15	0	6	0	0	
Box, Turkey	... ..	per ton	8	0	0	20	0	0	
Cedar, Cuba	... ..	per ft. sup.	0	0	3½	—			
Do. Honduras	... ..	do.	0	0	3½	—			
Do. Tobasco	... ..	do.	0	0	3½	—			
Elm, Quebec	... ..	per load	4	5	0	8	15	0	
Mahogany, Average Price for Cargo, Honduras	... ..	per ft. sup.	0	0	51½	—			
Do. African	... ..	do.	0	0	38½	—			
Do. St. Domingo	... ..	do.	0	0	4	—			
Do. Cuba	... ..	do.	0	0	1½	—			
Do. Lagos	... ..	do.	0	0	4½	—			
Do. Benin	... ..	do.	0	0	2½	—			
Do. Tobasco	... ..	do.	0	0	6½	—			
Oak, Wainscot	... ..	per log	2	5	0	5	15	0	
Do. American quartered, planks and boards	... ..	per ft. cu.	0	2	6	0	5	0	
Do. Dantzic & Stettin	... ..	per load	3	0	0	6	10	0	
Do. Quebec	... ..	do.	5	0	0	8	0	0	
Teak, Rangoon, planks	... ..	do.	8	0	0	15	10	0	
Do. Indian logs	... ..	do.	10	0	0	18	10	0	
Do. Indian planks	... ..	do.	13	0	0	20	0	0	
Do. Mouline logs	... ..	do.	6	10	0	8	0	0	
Kauri pine logs	... ..	per ft. cu.	0	1	6	0	2	0	
Do. do. planks	... ..	do.	0	3	0	0	3	6	

Complete List of Contracts Open.

DATE OF DELIVERY.		WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:				
Dec.	22	Weymouth—Post-office	Commissioners	H.M. Office of Works, Storey's Gate, S.W.
"	22	Baildon, Yorks—Two Houses	Mr. R. Rigg	J. H. Baker, Calverley Chambers, Victoria Square, Leeds.
"	22	Bowness, Westmoreland—Erection of Rooms	Rev. J. S. S. Moore	S. Shaw, Architect, Kendal.
"	22	Whitby—House	Guardians	E. H. Smales, 5 Flowergate, Whitby.
"	22	Llandaff—Gymnasium	Urban District Council	J. W. Rodger, 14 High Street, Cardiff.
"	22	London, E.—Nurses' Home	Urban District Council	J. M. Knight, 35 Bancroft Road, E.
"	22	Blackrock—Alteration, &c., to Offices	Education Committee	G. L. O'Connor, 198 Great Brunswick Street, Dublin.
"	23	Langley, Sussex—Coastguard Building	Vicar of Christ Church	Director of Works Dept., Admiralty, 21 Northumberland Avenue, W.C.
"	23	Eccles, Lancs—Partition, &c.	Town Council	E. Parkes, Town Hall, Eccles.
"	23	Ebbw Vale, Mon.—Schoolroom, &c.	Hospital Committee	Vicarage, Ebbw Vale, Monmouthshire.
"	23	Cork—Town Hall	Urban District Council	City Engineer, Municipal Building, Albert Quay, Cork.
"	23	Cefn Hergoed, Bridgend—Hospital	Joint Hospital Board	P. J. Thomas, Architect, Bridgend.
"	24	Wombwell, Yorks—Library	Rev. F. W. Williams	A. B. Linford, Carlton Villa, Wombwell.
"	24	Chelmsford—Hospital	Kerr & Co., Ltd.	A. S. Duffield, 96 High Street, Chelmsford.
"	24	Glyncorrwg, Port Talbot—Chapel	Corporation	D. Evans, 40 Villiers Road, Blaengwynfi.
"	24	Preston—Warehouse	Town Council	Garlick, Sykes & Cotterall, 33 Winckley Square, Preston.
"	24	Portrose—Alterations, &c., to Church	Corporation	Ross & Macbeth, Queen's Gate Chambers, Inverness.
"	26	Dartmouth—Slaughter-houses	Town Council	A. Smith, Victoria Chambers, Dartmouth.
"	27	Stratford-on-Avon—Repairs to House	Corporation	R. Dixon, Municipal Offices, Stratford-on-Avon.
"	28	Bradford—Extension of Vegetable Market	Lewisham Borough Council	F. E. P. Edwards, Whitaker Buildings, Brewery Street, Bradford.
"	28	London, S.E.—Stables	Municipal Technical Instruction Committee	Surveyor's Department, Town Hall, Catford.
"	28	Londonderry—School	Bridges and Roads Committee	D. Conroy, 21 Shipquay Street, Londonderry.
"	28	Newcastle-on-Tyne—Bridge Works	Lord Shuttleworth	J. A. Bean, Moat Hall, Newcastle-on-Tyne.
"	28	Kendal—Keeper's Lodge	Guardians	J. F. Curwen, 26 Highgate, Kendal.
"	29	Bradford, Manchester—Alteration, &c., of Police Station	Rev. W. French	Worthington & Sons, 46 Brown Street, Manchester.
"	29	Cadleigh, Devon—Rectory, &c.	Urban District Council	E. H. Harbottle & Son, County Chambers, Exeter.
"	29	Coleraine, Ireland—School	Committee of Moriah Chapel	W. & M. Given, Diamond, Coleraine.
"	29	Tonypandy, Wales—Chapel	Corporation	J. Rees, Pentre.
"	29	Northampton—Block at Hospital	Welsh Calvinistic Methodists	A. Fidler, Guildhall, Northampton.
"	30	Whitland, Carmarthen—Shops, &c.	Education Committee	W. Phillips, Paris House, Whitland.
"	30	Glyn-Neath, Wales—Chapel	Llidesdale District Committee	Jones & Morgan, Victoria Chambers, Pentre, Rhondda.
"	30	Lochalsh—Erection of School	Joint Drainage Committee	William Mackenzie, Architect, Dingwall.
"	31	Humanby, Yorks—Council School	Education Committee	Clerk of Works, Beverley.
"	31	Maes-evan, &c., Wales—Farmhouses	W. G. Clarke	D. Jenkins, Architect, Llandilo.
"	31	Newcastle, N.B.—Fever Hospital	Education Committee	A. Inglis, 12 Bridge Street, Hawick.
Jan.	3	London, N.—Alterations, &c., to Press House	Co-operative Society	W. H. Prescott, Coombes Croft House, 712 Tottenham High Road, N.
"	3	Wisbech—Alterations to House	Urban District Council	H. F. Simpson, County Surveyor, Wisbech.
"	4	Buxton—Mintthorp Homes	Commissioners	W. R. Bryden, F.R.I.B.A., Buxton.
"	4	Felixstowe—Coach-house	Water Co.	H. W. Buxton, 26 Hamilton Road, Felixstowe.
"	4	Middlesbrough—Erection of West Wing to School	Rathdown No. 2 R.D.C.	Lofthouse & Sons, 62 Albert Road, Middlesbrough.
"	4	Dewsbury—Wesleyan Sunday School		Danby & Simpson, 73 Albion Street, Leeds.
"	4	Radcliffe-on-Trent—Shops		Calvert & Gleeve, Low Pavement, Nottingham.
"	4	Long Eaton—Ten Houses		E. B. Ridway, Main Street, Long Eaton.
"	4	Newhaven, Sussex—Hospital		F. J. Rayner, 34 Meeching Road, Newhaven.
"	4	Sunderland—Taking down Old Post-office and erecting New Building		Henderson & Hall, 28 John Street, Sunderland.
"	9	Walthamstow—Alteration, &c., to School		H. Prosser, Committee's Offices, High Street, Walthamstow.
"	9	Sunderland—New Offices		W. & T. R. Milburn, 20 Fawcett Street, Sunderland.
"	11	Loughlinstown, Ireland—Nine Cottages		P. Cunnam, Clerk, Loughlinstown.
ENGINEERING:				
Dec.	22	Runcorn—Boiler	Guardians	G. F. Ashton, 71 High Street, Runcorn.
"	22	Stockport—Compressors, &c.	Gas and Electricity Committee	S. Meaney, Portwood Gasworks, Stockport.
"	22	Wimborne, Dorset—Heating Apparatus	Guardians	W. J. Fletcher, Architect, Wimborne.
"	22	Glasgow—Electric Motor Equipment	Corporation	J. Dalrymple, 102 Penfield Street, Glasgow.
"	22	Manchester—Switchboards, &c.	Ship Canal Co.	W. H. Hunter, 41 Spring Gardens, Manchester.
"	23	Hull—Footbridge, Subway, &c.	Corporation	A. E. White, Town Hall, Hull.
"	26	Leith—Tramway Cars	Corporation	T. B. Laing, Council Chambers, Leith.
"	27	Johannesburg—Cranes	Municipal Council	Mardey & Dawbarn, 82 Victoria Street, S.W.
"	27	Johannesburg—Transformer Pillars	Municipal Council	Mardey & Dawbarn, 82 Victoria Street, S.W.
"	27	Rochdale—Switchgear	Corporation	Lacey, Sillar & Leigh, 2 Queen Anne's Gate, S.W.
"	29	Waterloo, Lancs—Fire-engine	Urban District Council	F. S. Yates, Town Hall, Waterloo.
"	30	Hanley, Staffs—Sewage Distributors		Wilcox & Raikes, 63 Temple Row, Birmingham.
"	31	Drogheda—Heating	Camberwell Borough Council	Town Clerk, Courthouse, Drogheda.
Jan.	1	London, S.E.—Electric Bells, &c.	Corporation	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
"	1	London—Engineering Work	Urban District Council	Engineer's Office, Public Health Department, Guildhall, London.
"	2	Mansfield, Notts—Sewerage Works	Great Western Railway Co.	Messrs. Hodson, Engineers, Loughborough.
"	3	London, W.—Conductor Rails, &c.	Rural District Council	Kennedy & Jenkin, 17 Victoria Street, S.W.
"	3	Cricklade, Wilts—Waterworks	Drainage Committee	F. Redman, 34 Wood Street, Swindon, Wilts.
"	3	Tottenham—Engine Beds, &c.	Education Committee	P. S. Murphy, Coombes Croft House, 712 High Road, Tottenham.
"	6	Carmarthen—Sinking Well, &c.	Urban District Council	W. D. Jenkins, Shire Hall, Carmarthen.
"	6	Scunthorpe, Lincs—Waterworks	Public Health Committee	A. McCobban, Horne Street, Scunthorpe.
"	12	Belfast—Boilers	Urban District Council	Town Clerk, Town Hall, Belfast.
"	12	Bettws-y-coed, Wales—Waterworks Extension	Asylums Committee	Council Offices, Church Hill, Bettws-y-coed.
"	23	Epsom—Hot-water Plant, &c.	Gas Commissioners	Clerk to Committee, 6 Waterloo Place, S.W.
"	28	Giurgevo, Roumania—Electric Light	Ports and Lights Administration	Municipal Offices, Giurgevo.
"	30	Edinburgh—Gas Exhausters, Engines, &c.		W. R. Herring, New Street Gasworks, Edinburgh.
April	1	Lulea, Sweden—Dredging		Harbour Office, Lulea, Sweden.
May	1	Suakin (Red Sea)—Lighthouse		Deputy-Controller-General, Ports and Lights Administration, Alexandria, Egypt.
IRON AND STEEL:				
Dec.	24	Brazil—Metallic Wire	Central Railway	Commercial Intelligence Branch of Board of Trade, 73 Basinghall Street, E.C.
"	24	N. Walsham—Pipes	Urban District Council	J. S. Empson, Clerk, N. Walsham.
"	28	Cheltenham—Emergency Exits	Guardians	James Villar, 2 Essex Place, Cheltenham.
PAINTING AND PLUMBING:				
Jan.	1	London—Painting and Plumbing Work	Corporation	Engineer's Office, Public Health Department, Guildhall, London.
ROADS AND CARTAGE:				
Dec.	22	Southend-on-Sea—Making-up Streets	Corporation	E. J. Elford, Borough Surveyor, Southend.
"	22	Saltburn-by-Sea—Making-up Streets	Urban District Council	G. S. L. Bains, Surveyor, U.D.C., Saltburn.
"	23	Hull—Making-up Streets	Corporation	A. E. White, Town Hall, Hull.
"	23	Newmarket—Tar-paving Materials	Urban District Council	S. J. Ennion, Deva Chambers, Newmarket.
"	28	Carmarthen—Road Materials, &c.	County Council	C. H. Mounsey, County Surveyor, Carmarthen.
"	29	Greenwich—Granite Spalls	Guardians	Union Offices, Greenwich.
"	31	Horsham—Flints, &c.	Roads and Bridges Committee	W. McIntosh, Worthing Road, Horsham.
Jan.	10	Southall—Making-up Roads	Urban District Council	R. Brown, Public Offices, Southall.
"	20	Willesden—Road-making, &c.	District Council	O. C. Robson, Public Offices, Dyne Road, Kilburn.
No date		Colchester—Road Works	Trustees of late G. S. Errington	Baker & May, Head Street, Colchester.
SANITARY:				
Dec.	22	Nottingham—Sewer	Works and Ways Committee	A. Brown, Guildhall, Nottingham.
"	27	Swinton, near Manchester—Sewage Works Extensions	Urban District Council	H. Entwistle, Council Offices, Swinton, Manchester.
"	28	Linslade, near Leighton Buzzard—Sewerage, &c., Works	Urban District Council	Sands & Walker, Milton Chambers, Nottingham.
"	28	Market Harborough—Sewerage Works	Urban District Council	H. G. Coales, Council Offices, Northampton Road, Market Harborough.
"	31	Barnet—Construction of Sewers	Rural District Council	T. England, 14A Mount View, Bells Hill, High Barnet.
"	31	Wigmore, Herefordshire—Sewerage Works	Rural District Council	Wilcox & Parkes, 63 Temple Row, Birmingham.
Jan.	6	Radstock, Somerset—Sewerage Works	Urban District Council	Balfour & Son, 1 Victoria Street, S.W.
"	9	Wandsworth—Underground Convenience	Borough Council	Surveyor's Office, 41 High Street, Wandsworth.

MONTHLY

FIRE SUPPLEMENT

TO THE

BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.

Edwin O. Sachs, F.R.S.Ed., Architect,
Consulting Editor.Number 2.
December, 1904.

Summary.

Tenements should not be allowed in buildings containing large shops, bon marchés and stores filled with highly inflammable goods, nor even sleeping accommodation for employees. The risk certainly ranks very high, and a catastrophe can only be expected in the buildings of existing undertakings of this kind. Where, however, such tenements or sleeping accommodation exist, or where it is to be provided in similar buildings of this class, it is essential that these tenements should be thoroughly isolated from the shop premises below. (Page 19.)

At the Red Lion Market fire, in the City of London, the iron doors suffered in such a way as to prove that revised regulations are needed with regard to "Building Act" iron doors. All the teak doors were entirely destroyed. To make escape from a burning building it is necessary to get outside its enclosures at the earliest moment, either by the roof with ready access to all adjoining roofs or on to outside balconies having positions screened from windows. (Page 24.)

A wonderful system of plan-making has been applied by Mr. C. E. Goad—in the interests of the insurance companies—to the United Kingdom, Canada, South Africa and other colonies, which gives the truest possible picture of property and surroundings in a manner in no way attempted by the Ordnance Survey. At a glance the whole character of a district and the height, general aspect, construction, &c., of individual buildings can be ascertained. (Page 24.)

At an oil fire which occurred recently at Hamburg the oil floated across a canal and set fire to the buildings on the other side. The firemen prevented the burning oil spreading still further by directing their hoses on the water. (Page 29.)

We fear the want of precautions being taken on our existing underground or tube railways will result in some lamentable disaster. Everything we have heard regarding the construction and equipment of the new "tubes" under Mr. Yerkes's control shows that the matter is being thoroughly handled. (Page 30.)

There are warehouses which either do not lend themselves to iron construction or where it is more economical to use hardwood supports than metal supports, and where the question of the superficial area occupied by such supports is of small import. For these the Australian hardwoods are most appropriate, just as they are most appropriate for barks used as beams and for the so-called zin. fire-resisting doors. (Page 27.)

The explosion at the Waverley Hotel, Southampton Row, is another instance of the almost criminal neglect in the Metropolitan of means for rapidly shutting down the gas supply to blocks of buildings. (Page 29.)

ARMoured CONCRETE AND FIRE PROTECTION.

THE highly interesting paper read by Mr. Mouchel before the Royal Institute of British Architects on reinforced and ferro-concrete systems, and the Hennebique system in particular, naturally again arouses attention to this class of work from their fire protective point of view. The fire point of view was, however, curiously, scarcely dealt with at all; yet it should be remembered that failure in resisting fire in a constructional system advocated as being fire-resisting would immediately discredit it in the eyes of official surveyors and fire chiefs, just as so-called "fireproof" construction has been discredited owing to its not having done what it was originally advertised to do, and having given a false impression of safety.

We publish below an eminently interesting communication on this part of the subject by Mr. James Sheppard, the well-known surveyor of the North British and Mercantile Insurance Co., which deals with the system of construction from the fire protective point of view, and at the same time presents particulars of an unsatisfactory private test made by the contractors associated with this system before a number of insurance officers earlier in the year, as also of an official British Fire Prevention Committee test with a Swiss system referred to in a previous supplement. These tests appear to have been quite unusually unsatisfactory, as is, however, of course to be expected where the fire aspect of a system has not been duly considered. That the tests should, however, have been so very unsatisfactory is the more remarkable particularly as the first one was quite of a miniature description, i.e., of 45 minutes' duration up to a temperature of about 1,200 degs. Fahr. The second one (which resulted in a collapse) was of 1½ hour duration with a temperature ranging up to 1,940 degs. Fahr. The former was with quite a small section of flooring, and the latter only with an area of 10ft. by 10ft. The results of these tests, read together with the details of the official test reproduced in our columns in our previous "Fire Supplement," are certainly very disquieting, but nevertheless, in spite of the bad results of these various tests, we believe that if due precaution is taken as to the protection of the rods or wire-work from fire a thoroughly efficient fire-resisting construction can be obtained.

It would thus be of the utmost importance, and very much in the interests of the contractors and firms interested in these systems of construction, if some official tests were undertaken with a floor, say, of an area 20ft. by 10ft., preferably a series of such tests with different systems. Thorough floor tests would be of great value, both to the architectural and the engineering professions; and if proper precautions were observed in the

construction of such a floor there is no reason why good results should not be obtained.

We are of course fully aware that the question of protecting the rods near the soffit of a floor is a matter of some difficulty, owing to its being so much in the interests of the designer to get the rods down as low as possible to the soffit, from the constructional point of view, whilst from the fire-protective point of view they should not be within zins. of the soffit.

Of course it would be of yet greater importance if some arrangement could be made by which not only one test but a series of tests could be conducted, so that comparisons might be obtained from various applications of the systems under review.

We are convinced that reinforced ferro-concrete systems have definitely come to stay, more particularly for warehouses and factory buildings. We would repeat that reliability from the fire point of view is quite as important as the constructive point of view; and we emphasize this the more, as we believe it has been somewhat neglected both here and on the Continent.

More attention should have been paid at the Institute to the fire question. The experience at Baltimore in respect to ferro-concrete was not a very happy instance for Mr. Mouchel to point to having regard to the official reports, which seem to indicate that the building was not subjected to the severity of the conflagration as generally supposed. But for all this, namely, the failures in the miniature test with the French system and the official test with the Swiss system, we hold that if Mr. Mouchel will take ordinary reasonable precautions with the Hennebique work he will be able to satisfy his critics and undergo a test with every probability of success.

These little points, though not affecting our generally favourable view as to ferro-concrete for fire-resisting purposes if suitably designed, are rather glaring instances of the very little attention paid to the fire question in connection with this very interesting system of construction.

Some Observations by James Sheppard, A.I.E.E., Insurance Surveyor.

Reinforced or ferro-concrete systems of construction, although especially suitable for use in the erection of fire-resisting buildings, do not supply any new principle for protection against the action of heat; therefore precautions shown by experience to be necessary to secure fire-resisting qualities in other methods must also be observed when erecting buildings with these newer systems, if protection against the action of fire is required.

The precautions referred to are now well-known, being chiefly—

(1) The use of incombustible materials that do not change to any important extent under the action of fierce heat and sudden cooling by powerful streams of water, and of careful workmanship properly applied.



FIG 1.—NOS. 38 AND 40, KEREPESESTRASSE, BUDAPEST, AFTER THE FIRE.

(2) Complete encasement of all constructional metal, with a non-conducting fire and water-resisting substance not less than 2 ins. in thickness, secured so as to retain its position under the action both of great heat and streams of water.

(3) Limitation of buildings, or their securely separated compartments, to a moderate area and capacity, regulated by the nature of their contents.

(4) Protection from fires that may occur outside the fire-resisting building.

It will be a great misfortune if, by taking liberties with these new systems of applying materials, they become discredited, as is now the case with earlier forms of so-called "fireproof" structures, which practical firemen have found, when their contents are freely burning, to be the most dangerous and difficult buildings they meet with.

The importance of these precautions was shown in the case of the Fidelity and Guaranty Co.'s building, No. 111, East German Street, Baltimore, involved in the conflagration of February last. Part of this building, having basement, four storeys and attic, covering a ground area of 1,700 ft. super., was constructed in ferro-concrete, broken granite being used for the aggregate, with the result that exposed angles of the concrete in piers and beams where subject to considerable heat split off, exposing long lengths of the metal reinforcing rods.

With a continued high temperature, which may be the case when the storeys of a building filled with combustible goods take fire, the tensile resistance of the metal would be seriously weakened, leading probably to collapse. The action of the concrete under heat also showed that better results would be obtained by rounding off all external angles in place of finishing them with a sharp arris.

Some Tests described by Mr. Sheppard.

In March last a fire test was made in London of a box formed ten weeks previously in ferro-concrete by Messrs. Cubitt to instructions furnished by Mr. Mouchel. The box alone enclosed about 5 cub. yds.; two of the sides were 4 ins. and 6 ins. thick. There was no floor to the block, the sides of which rested on brick walls 3 ft. high; the top or ceiling of the box was 4 ins. thick, with a beam projecting 6 ins. below the underside and 4 ins. wide. This arrangement gave a

space of about 9 cub. yds.; this space was nearly filled with wood and shavings, which were set on fire, vent holes being provided in the upper part of one side of the box. The concrete used was composed of screened Thames gravel varying in size from $\frac{1}{8}$ in. to $\frac{3}{4}$ in., sharp sand and best Portland cement very finely ground. The top of the box was loaded equal to 3 cwt. per ft. super.

A fire was maintained inside the box for 45 minutes, the maximum temperature to which the concrete was subjected being probably not more than 1,200 degs. Fahr. About 20 minutes after the fire was started cracks appeared on the outer face of the concrete on all sides and also on the top; in some parts these cracks were $\frac{1}{4}$ in. wide. On the box being cooled by streams of water, an examination was made of the inside, portions of which had been finished with a coat of cement plastering. Most of the plastering was found to have flaked off, the face of the concrete being spotted in places by the splitting of pebbles or flints composing the aggregate. Slight air cracks corresponding with the wider cracks on the outside could be seen, but generally the inner face of the concrete was less affected than the outside, with the exception of the splitting of pebbles and flints referred to.

The reinforcing rods varied from $\frac{3}{8}$ in. to $\frac{1}{2}$ in. diameter, with stirrups of $\frac{3}{8}$ in. hoop-iron of 19 B.W.G. The thickness of concrete from its surface to the metal rods varied from $\frac{3}{4}$ in. to 1 in. The heat could not be continued for a sufficient time to subject the rods to a reliable test. It has been suggested that the cracks in the concrete may have been caused by settlements in the brickwork, but in this case they would have passed through the concrete and be chiefly restricted to its outer face.

In August, 1903, a fire test was made by the British Fire Prevention Committee of a Swiss floor formed with reinforced trussed hollow concrete beams placed side by side. $\frac{5}{8}$ in. iron reinforcing rods were embedded in the concrete, which was composed of sand and Portland cement 3 to 1; the thickness of concrete from its surface to the metal rods was about $\frac{3}{4}$ in. The floor was loaded equal to 224 lbs. per foot. When the temperature had reached 1,940 degs. Fahr., to which it had been raised from 64 degs. in 105 minutes, five out of the fifteen beams included in the test collapsed.

LARGE SHOPS AND STORES.

THE increasing number of large shops, bon marchés and stores filled with highly inflammable material requires the attention of the public authorities. These premises as at present generally conducted form quite a class of their own. They can be divided into two divisions—(1) those which are contained in buildings entirely devoted to business purposes, and (2) those which are used only partially for business purposes and partially for tenements or living-rooms of employees.

Regarding the buildings that have no night population, the risk of life is nevertheless very considerable to employees and customers during shopping hours, owing primarily to the narrowness of gangways, the lack of proper staircase facilities and the lack of suitable exits. The risk of fire occurring is considerable during the winter months, where steam-heating is generally employed and also various modes of artificial illumination which involve certain dangers.

For the buildings that have a night population the risks are considerably enhanced, and if a fire occurs in such premises, whether by day or night, a large number of residents, tenants or employees, as the case may be, occupying the upper portions of such buildings must have their lives at stake.

Should a fire occur in the first named buildings, entirely devoted to business purposes but occupied with employees and customers, it may be assumed that the fire would have made rapid headway before the fire brigade can be called, and, further, that the exits would immediately become blocked. The route of exit would then chiefly be through the actual shop windows, the breaking of which, however, would create additional draughts.

Regarding buildings with tenements above, it may also be assumed that the fire would spread rapidly before the assistance of the fire brigade could be called. If occurring at night or during the day time, when occupied by a substantial proportion of the tenants, the means of exit for these located in the upper floors would probably be found to be cut off by smoke rising up the various stairways, and the result would be that the lives of those in the upper floors would be entirely dependent upon fire-brigade efforts, which

efforts would, however, be materially handicapped by the fierceness of the flames in the lower storeys owing to the highly inflammable character of the goods.

Speaking generally, tenements should not be allowed in such buildings at all, nor even sleeping accommodation for employees. The risk certainly ranks very high, and a catastrophe can only be expected in the buildings of existing undertakings of this kind. Where, however, such tenements or sleeping accommodation exist, or where it is to be provided in similar buildings of this class, it is essential that these tenements should be thoroughly isolated from the shop premises below. This can only be attained by the construction of substantial fire-resisting divisions in the form of a heavy floor supported by steelwork duly and thoroughly protected; further, by the provision of many exit staircases that have no communication with the shop premises; and, thirdly, by limiting the possibility of the spread of fire from floor to floor by affording due protection to the lower window openings.

It is, of course, quite probable that a fire should any day occur in one of the many buildings of this class, and if the premises happen to be in a frequented neighbourhood or in a fashionable district and involve loss of life among the more fortunate members of the community, such a fire would no doubt be followed by panic legislation and safeguards of a drastic character. Such panic legislation and precautions of a drastic character are at the present moment being enforced in a good many cities of the Continent, owing to the terrible fire that occurred at the "Parisien Store" at Budapest.

This fire, though fortunately occurring in daylight and at a time when the tenement above the store was not fully occupied, involved a loss of life of no less than thirteen persons, together with a list of nineteen

injured. The fire happening seriously about 7 p.m., just upon closing time, the shop premises were fortunately not as full of customers and employees as would have been the case in the afternoon, but it would yet appear that there were about 300 people on the premises, who managed to escape by three exits, with the result that only a few were slightly injured and only one killed.

Of course, examination has shown that the stores in question had innumerable faults, chief among these being those due to structural alterations made apparently without the cognizance of the local authorities. Certain partitions had been cut down, certain openings made and other changes undertaken, which all added to the risk of the building in question. Besides this, in this individual case the actual cause of the fire appears to be that of gross and, we might say, unaccountable negligence in the electrical-lighting installation. Nevertheless, there are numerous premises in the Metropolis which, with perhaps the exception of the faulty electrical installation, are very much on all fours with the scene of the Budapest catastrophe, and, what is more, the electrical installation is perhaps altogether non-existent and there is still the open gaslight to increase the actual risk of outbreak.

The Budapest catastrophe naturally again showed the extraordinary rapidity of this class of fire and that the number of lives at stake entirely dislocates the ordinary working of the brigade, the first units of the brigade that arrive necessarily being handicapped owing to the extent of the fire extinguishing and life-saving operations they are immediately expected to undertake. It was again shown how the mind of the subordinate official is scarcely able to grasp such situations; only a senior official of considerable experience would be able to do so, and such an official would scarcely be

immediately on the spot. Thus the whole problem of safety of life and safety of property in buildings of this kind are essentially problems of planning, construction and the suitable safeguards in the administration and management of such buildings. The local fire brigade must not be looked upon as a very effective factor.

We publish detailed plans and several photographs of the Budapest fire, together with translated extracts from a report on this fire by a well-known German fire-brigade officer, which, if somewhat harsh in language and scrappy in form, nevertheless should give, in conjunction with the illustrations, a very clear picture of the situation.

We have spoken to several Englishmen who, on the occasion of the recent Budapest Fire Congress, went over the building in question with a view of informing themselves as minutely as possible of the general questions of location. Their chief surprise was that even a greater number of lives was not lost, and that the fire should have occurred at the somewhat fortunate hour of 7 p.m., when on the one hand the shop premises were not fully occupied and on the other hand the tenements were not fully occupied. The Congress visitors generally, both English and foreign, also considered that there were quite a number of premises which could be pointed out in the West End and Kensington district of the Metropolis which were in no better condition than the buildings involved in Budapest, in some respects in a worse condition, for in Budapest the main building at least was of a very substantial fire-resisting character.

It is to be hoped that the Budapest fire will serve as an object-lesson, and that in time the public authorities may keep this class of building in mind, so that without there being any undue harsh legislation, caused by some catastrophe in the London

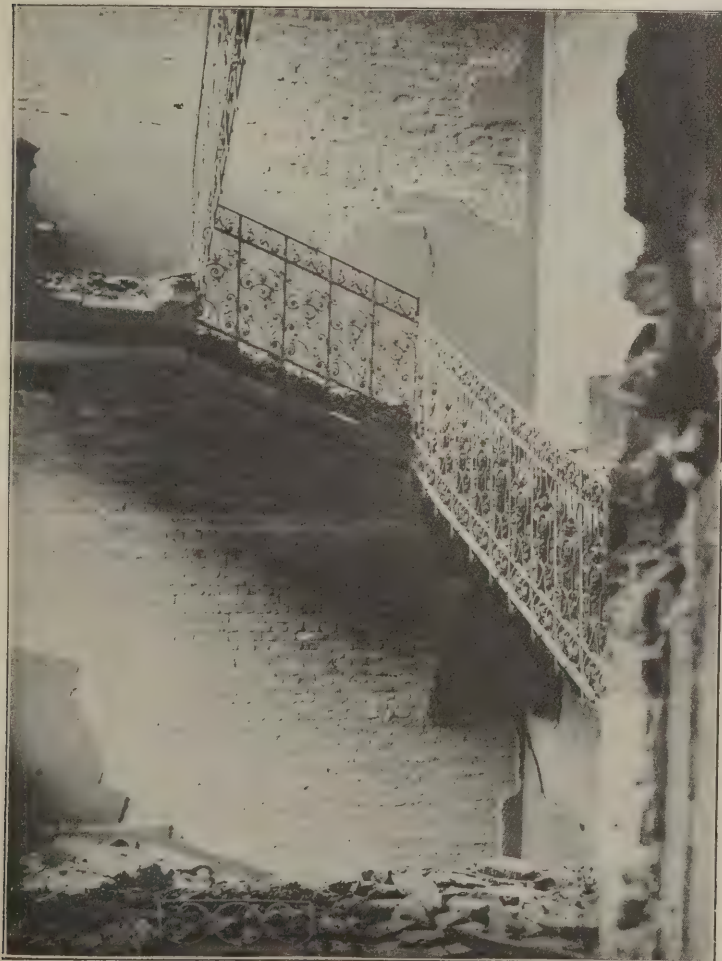


FIG. 4.



FIG. 5.

THE PRINCIPAL STAIRCASE OF NO. 38, KEREPESESTRASSE, BUDAPEST.



FIG 2.—THE CORNER OF NO. 38, KEREPESESTRASSE, BUDAPESTH, AFTER THE FIRE.

[x From this corner window of the fourth floor most of the occupants (including the proprietor's wife) jumped, and were killed by the balcony of the third floor.]

area, they may legislate sufficiently to obtain reasonable safety for both tenants and the public in buildings of this class.

The "Parisian Store" Fire at Budapesth.

The following is extracted from the German report:—On Monday, August 24th, at about 7 p.m., a fire broke out at the corner house, No. 38, Kerepeserstrasse and No. 1, Klauszalgasse, on the premises of the "Parisian Warenhaus," causing the death of thirteen persons and injuries to nineteen others.

The report is divided as follows:—Part 1, the buildings; part 2, the buildings after the fire; part 3, the report on the fire.

PART 1.—THE BUILDINGS. (See Plans.)

The premises occupied by the "stores" were located as follows:—(1) In the building No. 38, Kerepeserstrasse; (2) in the building No. 40, Kerepeserstrasse; (3) in the building No. 3, Klauszalgasse.

No. 38, Kerepeserstrasse.

This is a corner house, and consists of basement, ground and four upper storeys, and is massively built of stone, with flat roofs of fire-resisting material carried on iron girders. The cellars are in the form of vaults of fire-resisting material. The whole building forms an irregular square, the four sides of which enclose a court. The basement, ground and first floor were used for the purpose of retail "stores" and the other floors were occupied as flats, *i.e.*, as tenements. The lighting of the "stores" was effected partly by gas, partly by electric incandescent light. The electric wires were not cased, not even in the show windows. The fronts of the show windows on the first floor were externally lighted. The lifts in the "stores" proper were apparently small ones used for goods only. There were apparently four of these, all unenclosed and apparently put in

after completion of the building. They are not shown upon the plans, but one was traced in the wreckage. In the front main staircase a lift was installed for the use of the tenants. There are said to have been sixteen hand-pumps on the premises. No private fire-alarm call-point was provided.

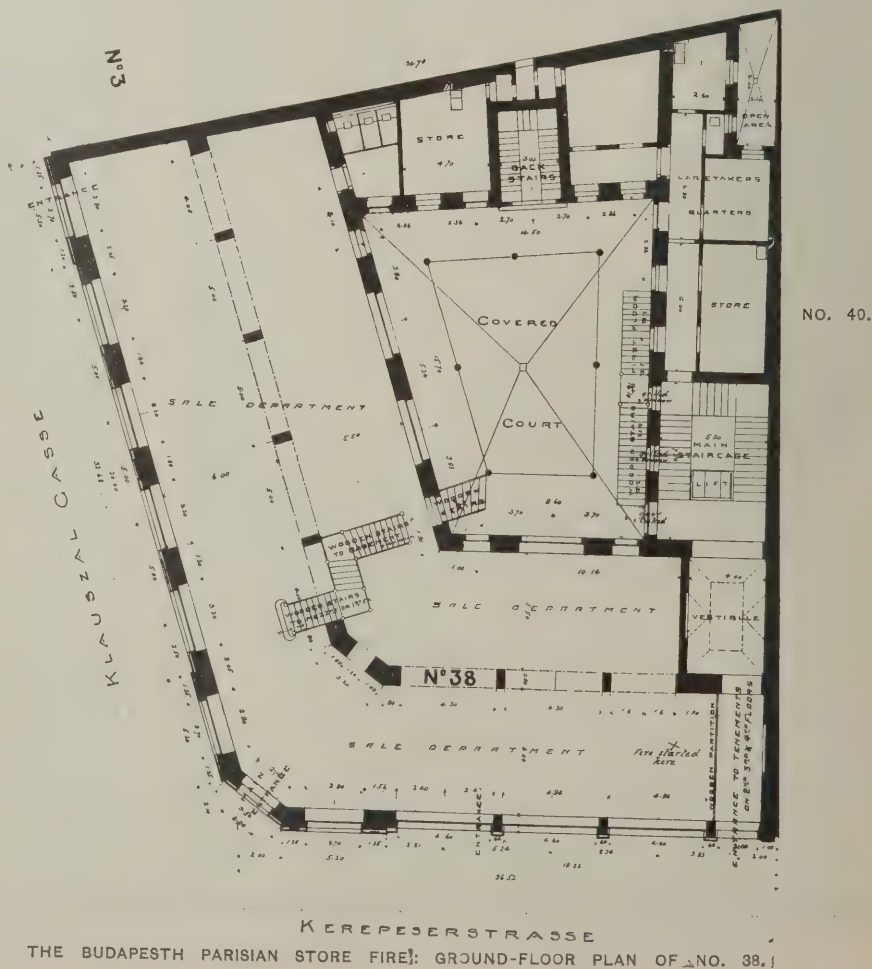
Round three sides of the above mentioned court, galleries ran at the level of each storey, giving access to the tenements. These galleries were about 1 metre (3ft. 3ins.) broad, massively constructed of iron, with an iron railing. Doors opened from these into the tenements, and they were reached by the front staircase. The residents in all the tenements, other than the front tenements had hence to traverse the front staircase and galleries in order to reach their apartments. The front tenements had doors directly off the landings of the staircase. The courtyard was roofed under the second floor gallery by somewhat unusual erection of glass and iron. The space beneath was made available for retail trade purposes, and with this object large openings had been formed in the surrounding walls on the ground floor.

The machinery was situated in the basement and consisted of a gas-engine and dynamo for supplying electric light and a boiler for the heating service. The gas meters were in the basement. Access to the machinery was obtained by way of the basement floor of the stores.

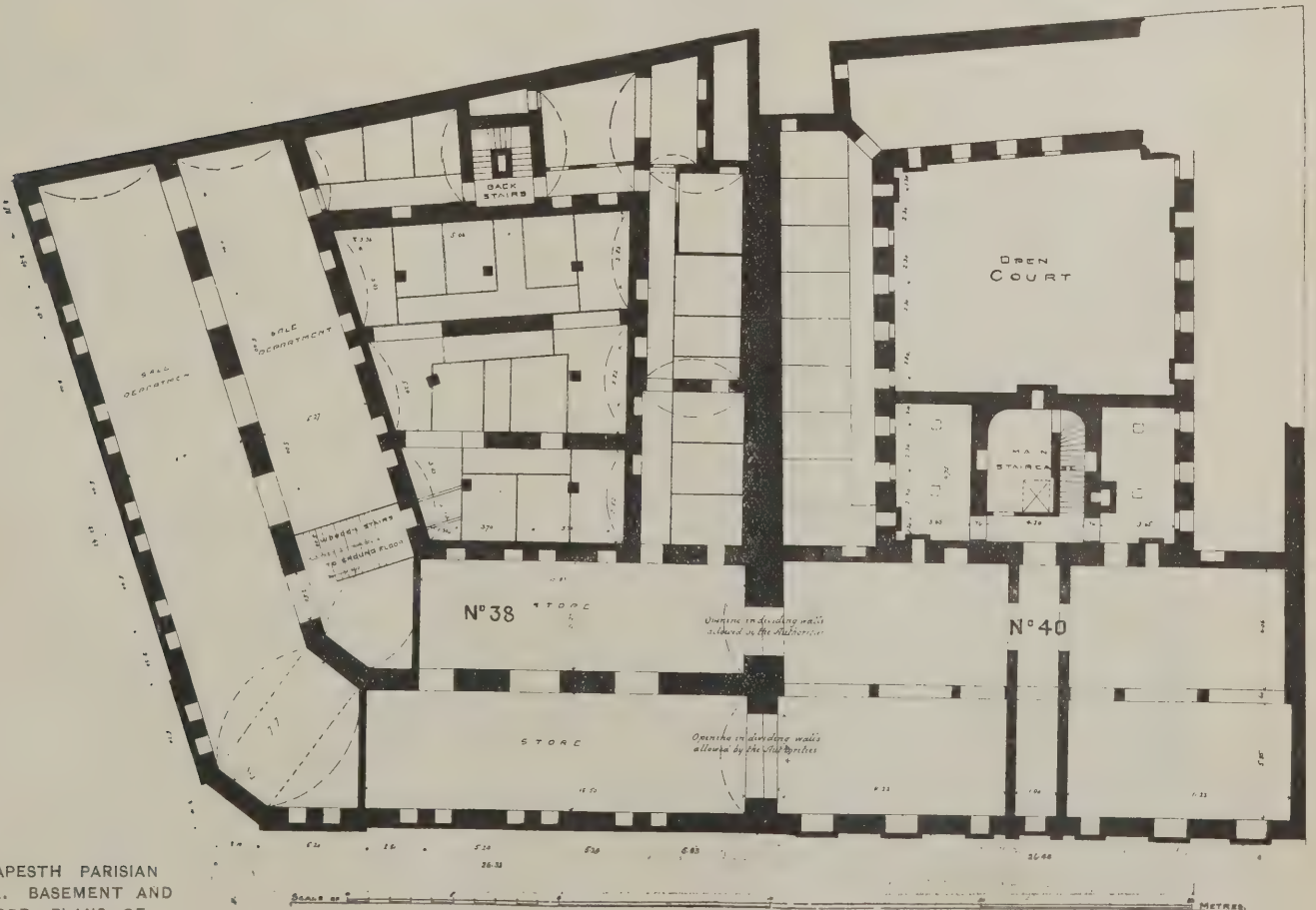
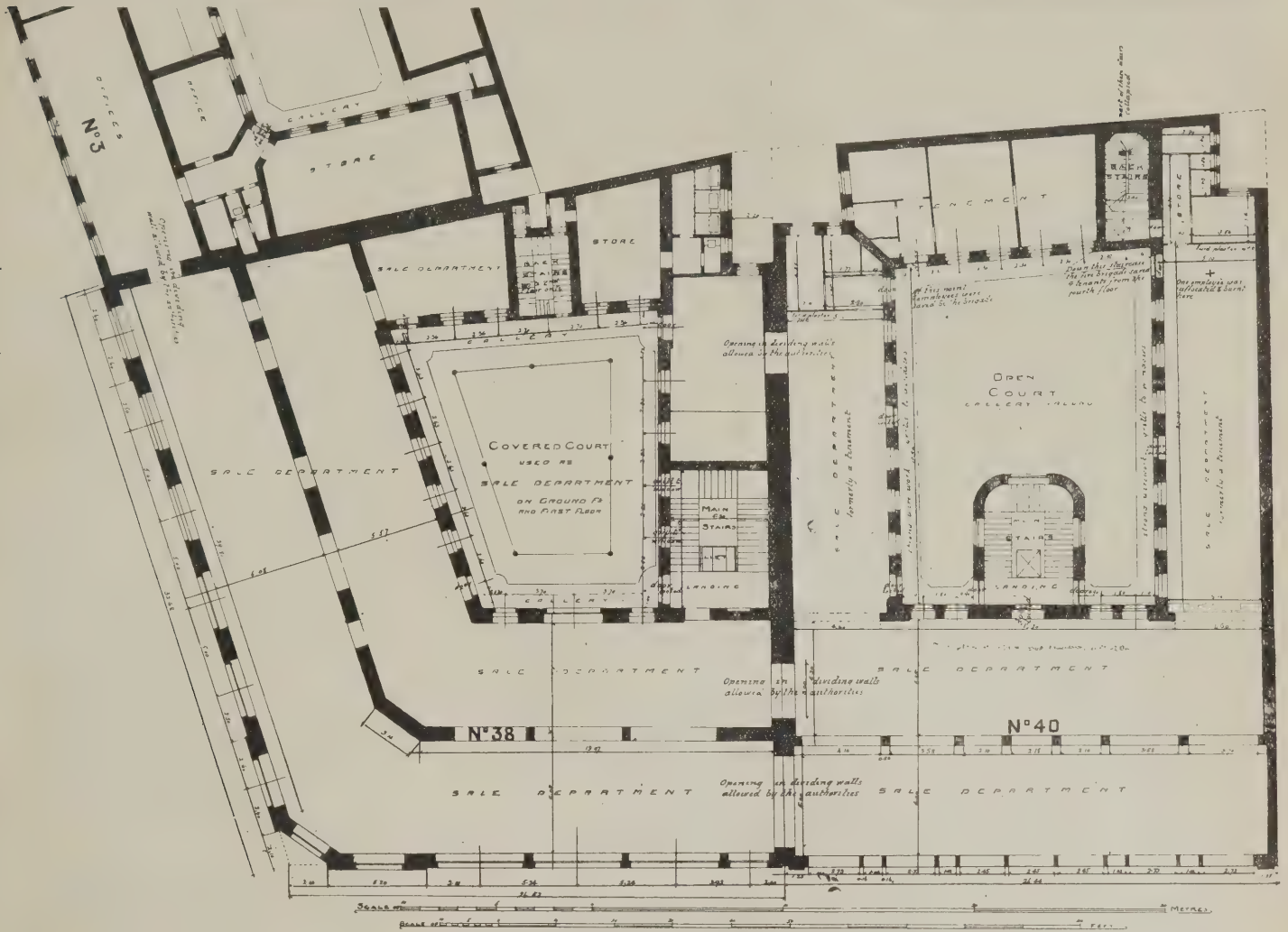
There was no system of emergency lighting. Two lighting services, *i.e.*, gas and electricity, were in use, but they were not interchangeable.

There was no kind of separation between the show windows and the shop counters.

Three exits led from the "stores" to the street—one each into the Kerepeserstrasse and Klauszalgasse, and one on to the corner formed by the two streets. The exits are said to have had swing doors and the collective widths of these openings was about 5 metres (16ft. 3ins.). There was one exit for the residents in the upper part of the premises having a breadth of 2 metres (6ft. 6ins.),



THE BUDAPESTH PARISIAN STORE FIRE: GROUND-FLOOR PLAN OF NO. 38.



THE BUDAPESTH PARISIAN
STORE FIRE. BASEMENT AND
FIRST-FLOOR PLANS OF
NOS. 38 AND 40

which was situated in the Kerepeserstrasse. There were no emergency exits.

The basement ground and first floors were supported partly by strong piers of masonry and partly by stanchions, measuring in rectangular section about 0.8 m. by 0.4 (3½ ft.). These were covered with a kind of metal lattice-work filled in and protected with concrete. There were also a number of unprotected cast-iron pillars, which carried the glass roof of the courtyard and the galleries situated in the "stores." The exposed portions of the girders were protected from fire by "asbestic cement," and the T-irons of the roof were bedded in concrete, leaving only the soffit exposed.

There were no divisional walls in the interior of the "stores." The "stores" were shut off from the passage to the tenements and main staircases on the ground floor by a partition. This was formerly solid, but it had been removed and substituted by a showcase with a wooden back.

There were two staircases in the building—one in the front (already referred to) and the other in the back. The former, as explained, was the main staircase leading from the entrance in the Kerepeserstrasse to the top floor. One side of this staircase was the party wall of the next house, No. 40. The steps were of sandstone, spandril shaped and supported on end, with an open well. The landings had iron supports.

On the side of the staircase facing the court there were on each storey a wooden door on to the galleries and two windows filled with ordinary glazing; there was also a wooden door on each floor landing for entry to the front suite of rooms. The back staircase was situated in the centre of the rear side of the court and was open to it. It was enclosed with a wall on three sides, and the stairs were of similar construction to those in the main staircase. There were no windows or doors opening on to these stairs. They led from the roof to the basement, and were intended to serve as for inter-communication for the residents of the back tenements. These stairs were originally also intended to have an outlet into the court, but were useless for this purpose as the court was used for the "stores," and, consequently, they terminated, so far as the residents were concerned at the second floor, the lower part being for warehouse purposes.

All doors were of wood. The doors leading from "stores" court on the ground and first floors into the main staircase were locked and covered with gratings, and the windows were treated in the same manner. There was direct communication between stores and the main staircase for fire and smoke by way of these windows into the stairs.

The connection between the various storeys in the interior of the "stores," in addition to the above mentioned stone back-stairs, was by wooden stairs. There were three of these, of which, however, two only need be considered, as both the stairs in the courtyard led to a common small landing (see ground plan) and may, therefore, be regarded as one. The third flight of stairs was near the corner entrance and went from the ground to the first floor and from the ground floor to basement. Another staircase led from the first storey to an intermediate gallery.

No. 40, Kerepeserstrasse.

This is a building of a similar style to No. 38, which it adjoins on the right. It consists of basement, ground and four upper floors; the back part contains a fifth storey. The basement and roof construction are as in No. 38. The front to the Kerepeserstrasse has several large balconies and bow windows. These premises also contain a central rectangular open court. Part of the front basement and the whole of the first floor were used for the purposes of the "stores," two suites of rooms on the right and left of the courtyard on the first floor having been converted into sale departments and the partitions removed.

The lighting and heating were the same as in No. 38, but there was no outside lighting.

In the main staircase there was a lift for the tenants. All round the interior of the courtyard ran galleries at the level of each storey, similarly arranged to those of No. 38. Here, too, the tenants in the wings and back of the building could only reach the staircase by way of the galleries.

There were no means of exit from the portion used as "stores" into the street, except through the openings in the party-wall into No. 38. The residents of the tenements entered from the ground floor by a doorway and passage in the centre of the block into the main staircase. Emergency exits and emergency lighting did not exist.

Here lattice-girders were exclusively used,

which were, however, only protected by ordinary plaster, otherwise the arrangements were the same as those in No. 38.

Two small spaces used for special purposes were shut off from the rest of the interior by fire-resisting partitions. Openings were formed in the party walls between Nos. 38 and 40, where the two sections of the "stores" joined each other.

Two staircases existed. The main staircase, as shown on the plan, was carried up to the top floor and was approached by a passage from the Kerepeserstrasse. It was constructed similarly to that in No. 38. On the level of each storey were three doorways closed with wooden doors, two giving exit to the galleries and one on the landing giving entrance to the front suite of rooms. There were also three windows on each floor looking on the courtyard. The second staircase was situated in the rear and to the right of the central court, and was only for the use of the tenants on the fifth floor. It went only from the second floor to the roof.

The doors were of wood, and those that led into the "stores" house were locked and strongly grated. The windows also of the "stores" which overlooked the gallery on the first floor were glazed and strongly grated, and some of the residents had to pass these in order to reach the main staircase.

The connection with ground floor and basement was affected solely, so far as the stores was concerned, by the stairs in No. 38.

No. 3, Klausalgasse.

This is a building adjoining No. 38, Kerepeserstrasse. It consists of a basement, ground floor and one upper storey. Generally it resembles the premises before described: residential tenements are situated around the court and the gallery serves as passage for the residents to the main staircase.

Part of the first floor had been taken into the "stores." An opening had been made in the party-wall dividing the two buildings.

The only door leading from this portion to the external gallery of the courtyard was always kept locked; whether there were also grated doors I was unable to ascertain. All the windows, both on the gallery and the street side, were glazed and strongly grated.

No other means of exit existed except through the opening in the wall on to No. 38, Kerepeserstrasse; the rest of the rooms in the building were used partly for business



FIG. 3.—CORNER OF NO. 38, KEREPESESTRASSE, BUDAPEST, SHOWING GROUND AND FIRST FLOORS AFTER THE FIRE.

purposes and partly as tenements, and had their staircase. Otherwise the buildings were similar to those previously described.

PART 2.—THE BUILDINGS AFTER THE FIRE.

No. 38, Kerepeserstrasse.

Speaking generally, the building afforded substantial resistance to the fire. At no point did the floors fall. The front wall on the Klauszalgasse showed some cracks. The cornices were partially broken away. The basement, ground and fourth floors were entirely burnt out, but in the second and third floors one tenement was left almost uninjured. The framework of the roof was completely destroyed. The lighting installations were entirely destroyed.

The gallery situated in the "stores" has partly fallen in, whilst the iron construction of the galleries above, especially the railings, have been much twisted. The glass roof over the courtyard was destroyed, the iron twisted and the glass partially melted.

The machinery remained intact. The show windows were all destroyed (Figs. 1, 2, 3). The stone piers showed serious cracks in places; the girders showed no change, although in many places the asbestic covering had fallen away. The T-irons of the roofs were unaffected. The cast-iron columns had not fallen, but several of them had buckled.

The wooden partition put in place of the solid partition dividing the main entrance passage from the "stores" had disappeared.

The walls of the staircases remained intact; no cracks in the masonry could be discovered. The sandstone steps had fallen and only parts of the landings remained in position.

The whole of the doors and windows were burnt out, with the exception of the inner window frames of the second and third floors, where only the glass was broken.

All the wooden staircases were burnt away, and the stone stairs at the back, into the courtyard, fell (Fig. 5).

No. 40, Kerepeserstrasse.

Here too the building has afforded resistance to the fire. There were no cracks in the masonry. The "stores" in the basement and first floor, together with some living-rooms at the back in the first and fifth floors, were partly burnt out. The lift in the front staircase remained uninjured.

The galleries in the courtyard, except those of the first floor, had not suffered.

The iron lattice-girders, which were only protected with a thin plaster, were bent.

The solid plaster partitions did not hold out against the fire. The plaster was split off and the wire lathing partly fused. The main staircase was undamaged, but part of the back stairs collapsed. The wooden doors of the "stores" were not damaged, but only charred. All the windows of the "stores" part were destroyed and the frames partly burnt away.

No. 3, Klauszalgasse.

The "stores" part was only partially burnt out. The wooden door to the courtyard gallery was undamaged. Otherwise this building offered no cause for remark.

PART 3.—THE FIRE.

The fire broke out in a showcase on the ground floor, in immediate proximity to the tenement entrance in the Kerepeserstrasse, directly after the engineer had set the dynamo in motion. All the electric light-wires were unencased, and most inflammable goods were close to the wiring and lighting material. Apparently a defect in the wiring set fire to these inflammable goods. According to the report from some of the employees, they tried to extinguish the fire themselves but did not succeed, and it was only then that the alarm of the fire was given, and that by telephone. The brigade first turned out an ordinary unit, but immediately upon arrival called up assistance from headquarters and eventually issued a brigade-call.

The brigade's attack was first directed at the seat of the fire, and an especial attempt was

made to gain the staircase of 38, Kerepeserstrasse. This did not succeed. Nothing was at first known of the number of persons in the upper tenements, but it was conjectured that there were some there, and an attempt was therefore made to reach the upper storeys from the Klauszalgasse by means of the long ladders. The attempt failed; the long wood ladders were scorched by the flames and were impassable. In the meantime a number of persons appeared at the windows of the tenements on the third and fourth storeys on the Klauszalgasse side. Jumping sheets were brought and some jumped. Nine persons lost their lives in jumping; the rest were more or less seriously injured. The reason why all attempted to jump was the density of the smoke from below combined with great heat. Unfortunately, however, a projecting balcony, on which most of the people struck in their descent, was the cause of the several deaths and injuries.

Meanwhile the other contingents of the brigade had succeeded in coping with the fire at the sides and forcing it back. A number of persons who had torn down the gratings over the windows were brought out of No. 40; also some people in the fifth storey of the rear tenement.

During the fire there had been no wind worth mentioning, yet, owing to the heat and sparks, a building opposite caught fire.

Of the 148 employees of the "stores" and the 150 customers who were in the stores at the outbreak of fire, only one of the latter was burnt. Of the thirteen persons killed—all were women except one.



RUINS OF RED LION MARKET FIRE, LONDON, ON OCTOBER 29TH, 1904.

A RECENT CITY FIRE.

By an Insurance Surveyor.

THE building situated in Red Lion Market, Whitecross Street, occupied as a costume manufactory, destroyed by fire which commenced about 7.30 a.m. on October 29th, 1904, was of basement and five floors in height, having a capacity of 250,000 cub. ft. To keep within this limit it had been necessary to fit double iron "Building Act" doors to all openings on to the brick-enclosed factory staircase, which was also fitted with teak doors between the double iron doors. In addition to this staircase there was an *unenclosed* teak stair through all floors, and also an *unenclosed* electric lift.

The floors had open wood joists carried on roll-slab girders resting on cast-iron stanchions. The building was covered with a lead flat—adopted to avoid the increased capacity a pitched roof would have involved. The ground-floor storey was wood-lined. Numerous electric motors were in use for working the sewing and other machinery. This building, filled with combustible stock, offered facilities for the very rapid spread of fire.

The cause of the fire has not been ascertained, but it probably commenced in the basement or ground floor at the back of the building. It was noticed (after burning, no doubt, for some time) by the employees at Messrs. Sutton's carriers' depot adjoining, who brought their private appliances into use but apparently did not call the fire brigade. Messrs. Sutton's employees soon discovered

The iron doors to the staircase were for the most part open, but the way in which these doors with their iron frames have

The long time the fire must have been burning before its discovery suggests the desirability of establishing in districts crowded with warehouses and workrooms a fire

[An inquest held upon this fire by Dr. Waldo, the City coroner under the powers of the Fire Inquest Act, elicited that the buildings were nearly thirty years old, had been passed by the factory inspectors of the London County Council, and the aggregate insurance on premises and stock was about £32,000. The jury were unable to locate the cause, and thought the buildings were suitably constructed for their purposes.]

For fire service purposes, too, such plans should be invaluable ; yet, curiously, we know of no English city where these plans are used by fire chiefs or fire departments with a view of being able immediately to gauge the character of the area affected by the fire and the risk at stake. It is high time that topography of this kind should be an element in the Fire Service Organization. It has been attempted in a small way, we believe, in Berlin, and also in Copenhagen, where special series of plans of the more important dangerous structures and districts are carried on the fire-engines in a handy form, so that the supervising officers can immediately identify their principal features, know where the hydrants are situated, the diameter of the mains, the character of the surrounding property, and the like. We trust that, as time goes on, it will be recognized that such maps or "land charts" are essential for fire service purposes. Much time and loss would be saved by their use.

EXPLANATIONS OF SIGNS USED ON INSURANCE PLANS OF CITIES IN GREAT BRITAIN
AND IRELAND.

S-SHOP. D-DWELLING
M.W-MANCHESTER WAREHOUSE H.W-HARDWARE
M.L-MATCH OR WOOD LINED P.H-PUBLIC HOUSE
S.I.D-SINGLE IRON DOORS. TENS-TENEMENTS
D.I.D-DOUBLE IRON DOORS
C.I.COLS-CAST IRON COLUMNS.
CORRUGATED OR CORR-CORRUGATED IRON.

Regarding the maps themselves, the following are some interesting notes taken from a lecture prepared on the subject of insurance plans and read before an insurance institute.

There are some 521 volumes of Mr. Goad's plans of Canada, dealing with every town that has a population of over 700.

There are further some 73 volumes of plans dealing with the 37 principal cities and towns of the British Isles.

Besides these there are volumes of plans relating to South Africa, the West Indies, &c.

The scale for these plans found most practical is 40ft. to the inch in Great Britain

and 50ft. to the inch in the Colonial cities. Only some areas are to a larger scale.

The plans are so prepared as to give as much information as possible in the concise possible form, without leading to confusion. A reference sheet has been reproduced in this supplement giving some general signs on the plans of Mr. Goad, and these are augmented by a colouring.

A matter of the utmost importance in this series of plans is their regular revision, and this is undertaken either bi-annually or tri-annually in a most systematic way.

In connection with this description of Mr.

Goad's plans, as far as the British Empire is concerned, it may be of interest that there is a similar system for the United States, by the Sanborne and Perris Map Co., which we believe deals with something like 5,000 different localities.

There are also a few plans of big Continental ports like Hamburg, Bordeaux and Antwerp, which have been prepared by local men; but the subjects of insurance plan-making, as also the whole science of fire insurance survey on the Continent, cannot be deemed to be anywhere near that of British and American fire insurance.



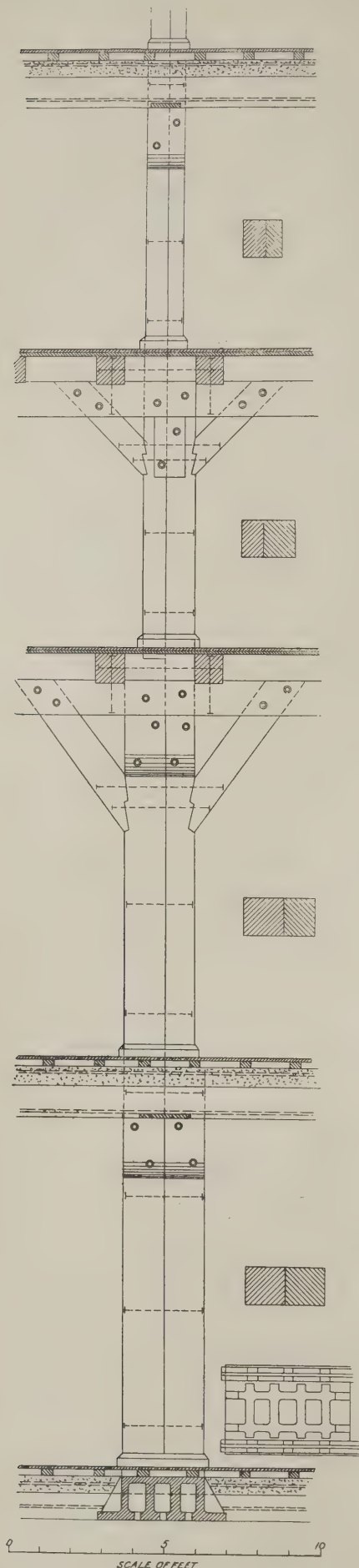
MODERN WAREHOUSES.

LAST year, on the occasion of the International Fire Prevention Congress, a most important paper was read in German by Chief Officer Westphalen, of the Hamburg Fire Brigade, who was formally a district surveyor in that city and during the past ten years has reorganized the fire service and fire-preventive work in the Hansa Territory, with the result that the annual fire loss has been materially reduced. Owing to the great number of papers presented at the time, Chief Officer Westphalen's words did not perhaps receive the attention they deserved, and we thus take the opportunity of presenting the English translation of his paper, which deserves the attention of all connected with factory and warehouse building.

At the same time we present plan and section of the general type of recent Hamburg warehouses, and a detail of the latest type of warehouses constructed with wooden supports and beams. Regarding the detail of the hardwood construction, we would particularly call attention to the fact that the

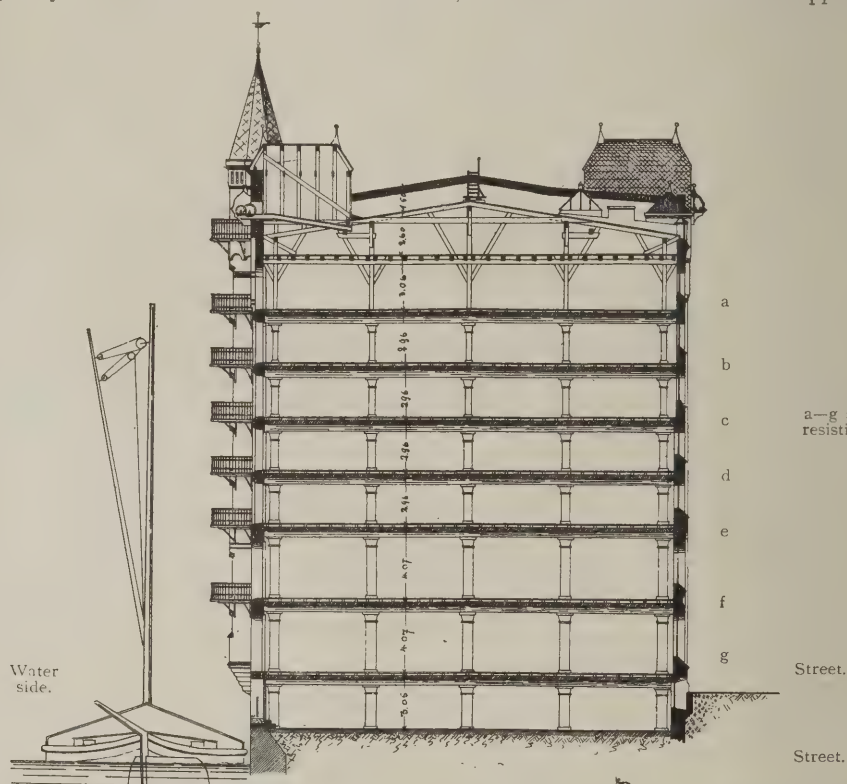
British Empire has a hardwood which lends itself in every way to construction of this kind, namely, the Jarrah wood and Karri wood, imported by Millar's Jarrah and Karri Company, which resists fire to a most marked extent. We constantly hear complaints that suitable beams cannot be obtained economically and that balks of teak are practically not procurable, whilst there is even a dearth of 2in. teak boarding. We think it is high time that the professional men in the metropolis and, indeed, throughout the British Isles should understand that all the really suitable hardwood necessary for fire-resisting purposes can be obtained from our own Colonies, and that by patronising our own Colonies' work they will have the benefit of getting an article which is superior to ordinary oak and superior to ordinary teak, as far as fire-resisting qualities are concerned, a point which has been proved over and over again.

There are certain classes of warehouses that do not lend themselves at all to iron construction, no matter how well protected. There are other warehouses where it is more economical to use hardwood supports, than

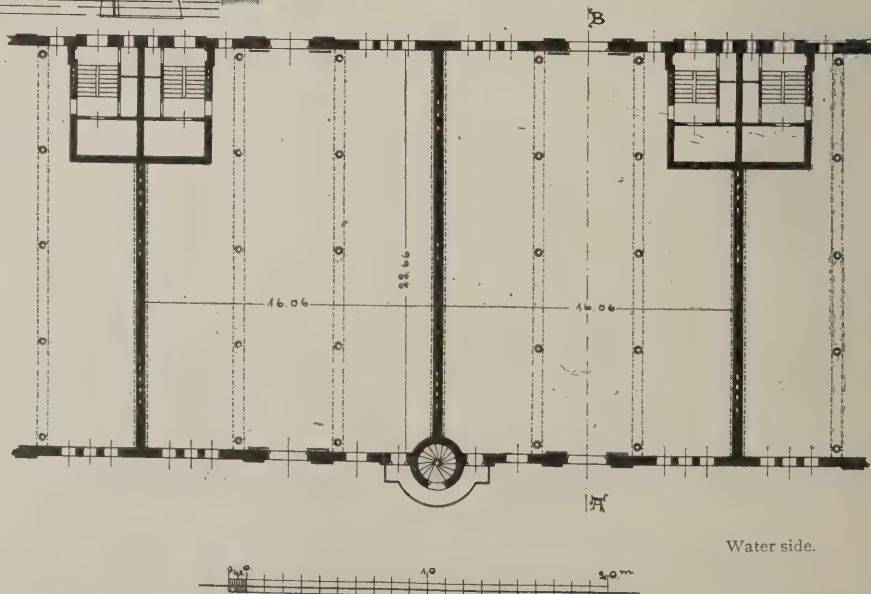


WAREHOUSES AT HAMBURG: SECTION SHOWING SLOW COMBUSTION TIMBER CONSTRUCTION.

(NOTE.—The 1st and 4th floors are pugged.)



a—g are fire-resisting floors.



NEW WAREHOUSES AT HAMBURG.



TYPICAL CONSTRUCTIONAL COLLAPSE WHERE UNPROTECTED STEELWORK IS USED.
(Note lattice-work stanchions entirely crumpled.)

metal supports, and where the question of the superficial area occupied by such supports is of small import. For these the Australian hardwoods are most appropriate, just as they are most appropriate for barks used as beams and for the so-called zin. fire-resisting doors.

We give a full translation of Chief Officer Westphalen's paper, and we publish herewith two interesting photographs of the ruins of unprotected metal-work as formerly used in the Hamburg warehouses prior to Chief Officer Westphalen's energetic propaganda against unprotected steelwork and unprotected metal-work generally. Such examples of unprotected steelwork tell their own tale. They refer to the type of warehouse that was built originally on the creation of the Hamburg free port in the 'eighties, which type has now been fortunately superseded.

Modern Warehouses and Sheds in the Free Hansa City of Hamburg.
By Chief Officer WESTPHALEN, Fire Brigade, Hamburg.

In the German Empire it is necessary, according to the regulations laid down in paragraph 16 and the following paragraphs, to obtain the permission of the authorities empowered by the laws of the nation: "For such buildings as by their local position or by the nature of the industries carried on in them might cause important prejudice, danger or annoyance to the proprietors or inhabitants of the neighbouring sites or to the public in general." It is therefore the duty of the authorities to prescribe in each case the measures necessary to secure safety from fire in the construction of the building and the working of the business.

But mercantile warehouses and stores do not fall under these regulations, although they contain great quantities of combustible

goods and also include some industries, except when the regulations from paragraph 16 *et seq.* are applicable to the latter, which, however, does not often happen.

In Hamburg, moreover, the Police Building Law now in force must be taken into consideration. This contains a number of regulations for fire protection and, among other things, enjoins that the outside walls must be solid and the roofs fireproof; but it provides no definition whatever of the space permissible between the party walls nor any regulations concerning the nature of the interior construction of the stores.

Only for that district of Hamburg which has been handed over to the "Freihafen Lagerhaus Gesellschaft" established under State guarantee has it been laid down in a law *ad hoc* that special sanction is necessary both for the building and working of stores. To this company belongs a very important part of the store district in Hamburg, containing up to the present 114 stores, covering an area of about 62,000 square metres. For these buildings, then, the authorities prescribe regulations and conditions both for construction and working as occasion arises.

Besides this, on the quays at Hamburg a great number of store-sheds have been erected almost exclusively by the State of Hamburg for its own use. These store-sheds cover a total space of about 385,000 square metres.

The business carried on in these quay sheds requires that large modern ships (carrying up to 22,000 cubic metres of goods) may be unloaded and loaded again in the shortest possible time. This is done by iron cranes on the quay, 272 of which are worked by steam, 215 by electricity, 17 by hydraulic power and 139 small ones by hand. The goods lying only a short time in these store-sheds, and being forwarded as soon as possible, must not therefore be piled up high. They must also be promptly sorted after

unloading. Accordingly each shed must be on ground-level and have space to take comfortably the whole cargo of the largest steamers.

The newest sheds are about 200 metres long and 50 metres deep. They have no partition walls. They are quite open to the quay in front, and the rear wall is of wood; at the two ends are solid gable walls which are carried above the roof. Between the different sheds there is generally a space of about 30 metres; in a few cases where two sheds are built together, being separated by the gable wall, any doors in this wall are fireproof. In this kind of construction each shed, occupying a space of about 10,000 square metres, presents a single great risk. The internal supports as well as the roof construction are of wood, while the roof itself is made of "pappe" (felt). Considering the circumstances, these are altogether the best materials. For one cannot use for these sheds materials which would completely resist a really large fire; the roof would, therefore, in any case suffer with the rest of the building through the fire, and also a light wooden construction can more easily be cleared away and renewed than one of iron. Wooden construction has the further advantage that the cost of a renewal is not a great consideration; on the other hand, the interruption of business caused by work of long duration would cripple any part of the quay in which it might happen and entail great loss of money.

The modern stores in Hamburg are constructed quite differently from these sheds. To the former, of course, different principles and different conditions are applicable. The ground on which these stores stand is very valuable, and the goods generally remain in them a long time; they are therefore built with a number of storeys. The newest Hamburg stores of this kind, as they are now



THE HAMBURG OIL FIRE.
(Building with heavy cast-iron columns, unprotected R.I. joists, and wood floor.)

built, are illustrated by a section. Such a store is about 16 metres wide and 22 metres deep inside, and has therefore, after deducting for staircases, an available floor-space of about 325 square metres in each storey. The outer walls are naturally of solid masonry, and the roof is fireproof, the gable walls being carried 1½ metres above it. The inside construction consists of iron supports protected by fireproof material and iron girders protected in the same manner. The ceilings between are made of concrete with layers of iron (system "Koenen"). Above this is a floor of wood.

Complete encasement with fully protective fire-resisting material—for instance, hard-burnt bricks, as is often practised elsewhere—would naturally offer the greatest security against danger from fire, but it costs considerably more than that used at Hamburg, and, with the good alarm system and organization of the Hamburg Fire Brigade, it must be taken for granted that the internal construction of these stores will resist a fire until

the fire brigade has had time to extinguish it.

The floor in each of the storeys has a slight fall towards the front and back in order to carry off the water that may have been used for extinguishing fire inside the stores, and by means of the outflow pipes fixed on the front prevent it from doing damage.

In these modern Hamburg stores each storey has therefore its own separate risk, which is not at all a great one.

The staircases of these stores deserve special notice. For each store there are two stairs—the one at the front for general use and that at the back for use only in case of fire. In order that the back staircase should take up as little of the valuable floor-space as possible, each staircase is so arranged that it serves at the same time for two stores. Access to these staircases is obtained by an iron balcony on each storey. The back staircase has a fireproof entrance in the cellar and leads up to the roof, where small iron stairs provide an escape in case of need over the

parapet wall. This practical arrangement of the stairs allows of the greatest possible use of the floor-space for storage purposes and at the same time gives the fire brigade the power of attacking the fire from two sides.

Most of the Hamburg stores serve only for storing goods, but some of them also contain working machinery. This cannot be avoided, as many business houses must manufacture their goods direct in the stores, but in such cases the plant is put in special compartments, which are separated by fireproof partitions from the stores. The unavoidable openings in the floors are also as much as possible protected by fireproof material, so that in such cases everything possible has been done to divide the whole building into as numerous, and therefore small, risks as possible.

If on the one side the Hamburg stores of the modern type may be considered "model buildings" from the standpoint of fire prevention, yet on the other side it must be pointed out that the fire organization of Hamburg has only been able to gain this success after many struggles. For a long time the civil engineers offered insurmountable opposition. Perhaps they were anxious not to hide their intelligently designed and elegantly executed iron structures, but to maintain them in full view of all the world. The old myth was continually served up anew that the iron might suffer from rust behind the fire-resisting covering: therefore this covering ought at least to be made removable. Such removable coverings are much too expensive and utterly impracticable for warehouse purposes. When the municipal fire office, supported by the fire insurance companies, energetically refused to take any more stores with unprotected iron construction, at first wood was again employed and supports and girders made of oak; but at last the fact that such a quantity of oak could not be obtained, or at least only at an impossible price, furthered the ends of the fire brigade. Since then the stores at Hamburg have been built according to the modern fire-resisting system.

Now we might suppose that the first insurance companies would allow a considerable reduction off the premium for goods which are stored in such model warehouses, but unhappily this is not the case. The fire insurance companies have formed a ring, and are fixing the amount of the premium to suit their own views, and they take care that the high premium shall be maintained as long as possible. This is indeed greatly to be regretted. I think the fire insurance companies, if they properly considered their own interests, ought, by reducing their premiums, no longer to refuse a practical recognition of the able and successful struggle of the fire brigade for fire-prevention, otherwise the State may yet carry out the idea of insuring such favourable risks as the Hamburg warehouses present.

THE HAMBURG OIL FIRE,

THE oil fire which occurred at Hamburg on October 27th last was extraordinary in many ways; and as it affords an object-lesson as to the danger of storing oils and inflammable liquids, which do not rank either as explosives or as petroleum, we are presenting some particulars by courtesy of the Hamburg Fire Brigade.

The fire started in large shed "A" of No. 316, Eifferstrasse, which was used for the storing of a fatty lubricating oil, the stock at the time of the fire comprising some 2,600 barrels. The building itself was of wood construction, comprising an excavated cellar, a ground floor and a high loft; a corner of the building is separated off to serve as stables. Between this building and the road



THE HAMBURG OIL FIRE.
(Building with heavy cast-iron columns and arched floor construction.)



(The Smoke Cloud.)



(Keeping the Oil from spreading along the Canal.)

THE HAMBURG OIL FIRE.

"BLOOMSBURY GAS EXPLOSION."

there was a substantial building used as a smithy and general workshop. This building comprised a ground floor and a first floor, and was a brick building. Adjoining these buildings was another shed building and a villa. The brigade on arriving immediately met with the difficulty of the intense heat developed from the burning lubricating oil, which had also commenced to flow into the adjoining canal, and floating on the top of the water created a huge pillar of flame, having as its base an area of about 300ft. by 120ft., i.e., the extent of the canal actually flooded with burning lubricating oil.

Owing to the fire having spread across the canal, the buildings on the opposite bank caught fire. One of these buildings was substantially constructed, but was principally filled with grocery stores, hams and other highly inflammable material. Another building which was full of fatty substances of the railway grease type also immediately caught alight, whilst the yards, &c., of these buildings seemed to have been occupied with empty barrels, packing materials and other easily burnable goods.

The brigade had the greatest possible difficulty in localising this fire, attacking it from the two roads running parallel to the canal and keeping the surface of the burning oil from spreading along the canal by working their branches into the water from both ends, thus preventing the burning oil drifting.

For all practical purposes all the buildings attacked were burnt out, i.e., gutted, but it is extremely interesting to observe the one building on the other bank, which had arched concrete floor construction supported by heavy cast-iron columns, appears to have fairly well withstood the heat, as is demonstrated in one of the photographs reproduced. In another building the cast-iron columns stood up well, whilst the unprotected girders naturally sagged and bent.

A point of importance to fire-brigade officers was the curious appearance at this fire of smoke spouts formed over the burning oil very much like water spouts, rising some 60ft. high, and then spreading the smoke at considerable velocity outwards, umbrella-fashion, in a very peculiar manner. The extraordinary amount of black smoke generally developed at this fire also called for remark similarly to the intense heat radiated.

The lesson of the fire is in the direction of limiting the storage of heavy oils, grease and other highly inflammable substances in densely populated areas.

The Royal Technical College in Hanover, which has university rank, has started a course on fire-protection, the chair being accorded to the local fire chief, Mr. Reichel who was formerly senior inspector in Berlin, and is an officer of very high education and great technical ability.

THE explosion at the Waverley Hotel, Southampton Row, is another instance of the almost criminal neglect in the Metropolis of means for rapidly shutting down the gas supply to blocks of buildings. It appears that the very heavy leakage was noticed, and that the public were even kept at a distance from the scene of the escape of gas in order that danger might be avoided, yet there was no rapid means of cutting off the gas supply in order to avoid the possibility of an explosion.

Similarly, it must be remembered that only recently in Piccadilly there was a very serious gas fire near the site of the new Ritz Hotel, in respect to which the gas supply could similarly not be stopped owing to there being no ordinary means for shutting down the mains in sections.

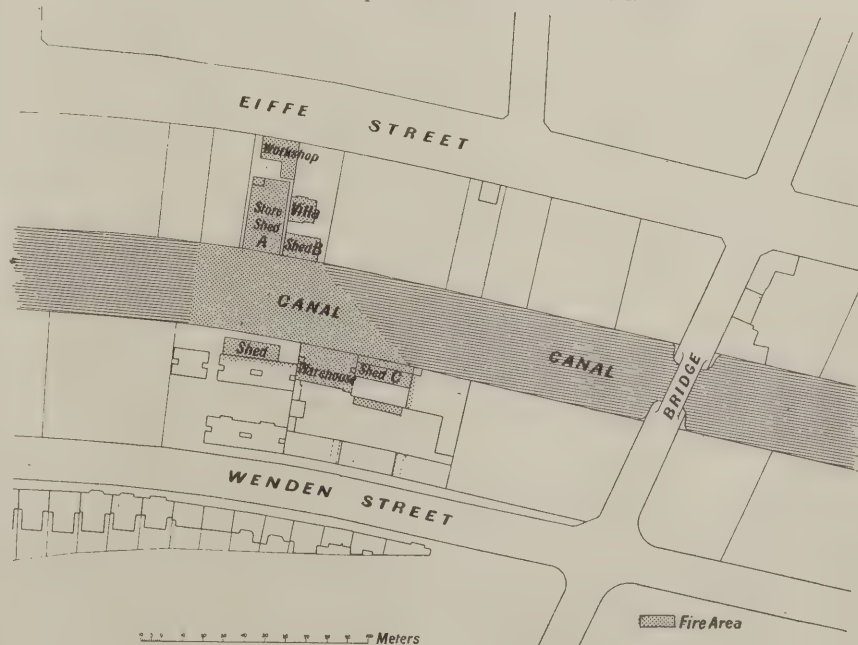
The lesson of the Southampton Row explosion is thus essentially one as to the necessity of better facilities in this direction.

The gas explosion occurred last Wednesday afternoon in the drapery and millinery establishment of Mr. F. W. Barber, Cosmo Buildings, Southampton Row. The cause of the explosion was the fitting of a new service pipe in the basement of shop. The gasfitter discovering that he had not at hand a cap it was necessary to adjust, sent his boy upstairs for it, and in the meantime applied his hand to the end of the pipe. The gas escaped in such quantities, however, as to overpower

him, and when given a free vent rapidly filled the basement. The police rescued the man, and before the explosion occurred the small crowd that collected had fortunately mainly dispersed, while luckily no vehicle was passing at the time of the explosion, which it was thought was caused by a glowing match thrown down by a passer-by in the street. The entire shop front was blown out, portions of the pavement were hurled in every direction, and windows smashed overhead in the Waverley Hotel, the premises of which extends over the shop, and in neighbouring premises. A fire naturally succeeded the explosion, but it did not attain great dimensions and was quickly extinguished by a couple of hydrants.

The Armour Institute of Technology, Chicago, has started a series of lectures on fire-protection, and it is a matter of considerable interest to observe that the subject is being dealt with seriously by an institution of this kind.

Officers' Designations in the London Fire Brigade.—The London County Council resolved at a recent meeting that the designations "second officer," "third officer" and "fourth officer" of the fire brigade should be abolished, and that the second and third officers should in future be designated "divisional officers," and that the fourth officer and any other principal officers who may be appointed should be designated "assistant divisional officers."



HAMBURG OIL FIRE.

FIRE RISKS ON ELECTRIC UNDERGROUND RAILWAYS.

THOSE who had hoped that the Royal Commission on London traffic at their sitting last summer would bring out some reliable points as to fire protection on underground electric railways were unfortunately soon disillusioned, for no independent evidence was apparently called, and such evidence as was given was of a very *ex parte* character. Whether the commissioners will touch on the subject in their report which is promised early next year is even very problematical.

As far as Mr. Yerkes's newly-constructed tubes are concerned, we believe that every effort will be made to make them as safe from fire as is practical. We are informed that the platforms will be of concrete; that wherever wood is utilized it will be of a non-inflammable character; that the railway carriages will be of non-inflammable wood and "Uralite" on steel frames; and that all ordinary wood that is burnable will be banished.

We are under the impression that Mr. Yerkes has this question of fire protection at heart, and that his effort is no mere "playing to the gallery" or intended for show purposes only. Everything we have heard regarding the construction and equipment of the new "tubes" under Mr. Yerkes's control shows that the matter is being thoroughly handled.

On the other hand, we regret to say that we anticipate some lamentable disaster on other existing railways, for it would almost appear that even Mr. Cunningham, the general manager of the Central London Railway, has not yet quite grasped what the meaning of fire protection is on underground electric railways. We say this after studying the evidence he has given before the Commission.

We will present the questions and his replies, which sufficiently speak for themselves. If these questions and replies be considered in conjunction with the actual facts of what occurred in Paris on the underground railway, we think the replies are simply astounding for their optimism or callousness. We prefer to think the former.

It is an amusing feature of the evidence that it fell to the lot of Mr. Cunningham to hand in the excellent provisional regulations of the Board of Trade, dated January, 1904. We should like to know how many of these draft regulations have so far been met on the railway over which Mr. Cunningham presides. We append a copy of the final regulations which have since Mr. Cunningham's evidence taken the place of the draft regulations in question, and any technically trained mind will immediately comprehend the difference between actualities on existing lines and what the Board of Trade considers advisable. It is only this last month that we have again had a slight accident on the Central London Railway to remind us of what is in store for the community if very material improvement is not shortly achieved.

Much, we regret to say, appears also to have been written under misapprehension in the daily press regarding the safety of our old underground railways as now in course of reconstruction and electrical modernization. We are told in the daily press that all new carriages on the Underground Railway are constructed entirely of non-inflammable materials. We should much like to have closer official evidence on this point, for as far as we can make out, although on the one hand the framing is naturally of steel and on the other hand such details as the non-inflammability of the curtains and textiles have been observed, there must surely be a considerable amount of woodwork in these carriages that is of a burnable character; for as far as we can trace the only carriages which will be in every way non-inflammable

are those on Mr. Yerkes's new "tubes," in which either English or French non-inflammable wood is being used as a substitute for the ordinary hardwood generally used in electrical railway carriages up to the present. We are subject to correction on this point, but as we can only trace two factories in Europe turning out non-inflammable wood—one in England and one in France—and we have made enquiries, we do not quite see how woodwork has been dealt with in the new carriages of the underground railways.

To revert, however, now to Mr. Cunningham's evidence before the Royal Commission, we present the plain questions and replies and let them tell their own lessons as to the amount of consideration the travelling public are receiving on one of the main arteries of electric locomotion at the present moment.

Royal Commission, Questions and Replies.

Q. Assuming that there was an accident to a train on the Central London Railway between two stations, how could the passengers get out of the tunnel?

Mr. C. They would simply step out of the end of the train and walk along the platform.

Q. Would not that be rather a dangerous proceeding?

Mr. C. No; we have done it on a good many occasions already.

Q. Have the passengers been able to come out?

Mr. C. Quite easily. The tunnel is lighted by a system of emergency lights that can be turned on from any station; besides that, every conductor has two hand-lamps, and the passengers are taken out with the greatest ease.

Q. Are those emergency lights lighted by a different electric system from the system that works the trains?

Mr. C. Yes, they can be so lighted; we can either light them from the ordinary current or we can light them from a storage-battery current as occasion demands.

Q. Do you take precautions in various ways on the Central London Railway to prevent the outbreak of fire?

Mr. C. Yes; we have done everything we can think of to provide against the danger of fire.* We have chemical extinguishers on the trains; we have hydrants upon every platform, with hose attached, and we have buckets of water always filled; we have all these appliances ready to use instantly.

Q. I believe you have constructed special cars, have you not?

Mr. C. Recently there have been some special steel cars constructed as an experiment more than anything else.

Q. Are they using cars of that sort in America?

Mr. C. They are going to use them, I believe.

Q. The chief danger in case of fire is from the smoke, is it not?

Mr. C. That, I imagine, would be the greatest danger. If any great conflagration happened the smoke would be very dangerous, no doubt.

Q. It was the smoke which did most of the harm in the accident in Paris?

Mr. C. I believe so. Of course the conflagration there became very serious—the smoke, the hot air and the panic.

New Requirements of the Board of Trade in regard to the precautions to be taken against the risk of accident by fire on underground electric railways:—

1. Sleepers to be of hardwood, not creosoted, and to be laid in concrete or ballast, and covered with a layer of gravel or finely broken stone free from dust, the ballast to be finished to a level surface so as to form a convenient roadway for passengers in case of emergency. If ballast is not used the space between the rails to be covered with grano-

lithic slabs, or slabs of a similar material to form as wide a roadway as possible for passengers. No timber planks to be used.

2. Tunnels to be provided with lights capable of being turned on from the stations at either end of each section and, if necessary, at some intermediate points. The lighting circuits to be independent of the traction supply.

3. Separate entrances to and exits from each platform of the stations to be provided and to be situated as nearly as possible in the middle of the platforms.

4. All stairways, passages and exits from the stations to be conspicuously lighted. Not less than 25 per cent. of the lights in these places to be supplied from independent source. If necessary, the exits to be made more conspicuous by the use of coloured lights in addition to white lights.

5. Platforms not to be made of wood, and woodwork to be eliminated as far as possible from signal boxes, lifts, offices, &c., below ground.

6. Efficient hydrants, hose and fire-prevention appliances to be provided.

7. Ventilating ways to be provided wherever possible from the station and the tunnels to the surface.

8. Cars to be constructed of metal, woodwork to be reduced to a minimum and to be non-inflammable. Hardwood to be used in preference to soft. Interior fittings, panels, seats, &c., to be of incombustible material.

9. No main electric cable to be carried through the train, and motors to be placed on the front and rear carriages only. No motor to be situated in the middle of the train.

10. Means to be provided at both ends of every train to enable passengers to alight from the cars in case of emergency. Oil lamps to be carried in every train.

11. India-rubber or other inflammable insulating materials to be avoided as much as possible, and the outer covering of cables to be un inflammable material that will not give off smoke.

12. Means to be provided for enabling a driver at any part of the tunnel to put himself into telephonic communication with the adjacent stations. HERBERT JEKYLL.

Board of Trade, May, 1904.

The London County Council's Views

as to fire appliances on new electrical underground railways, indicated under No. 6 of the Board of Trade Requirements, are as below:—

(A) The following are the minimum requirements as regards fire appliances provided the stations are of reasonable dimensions:—

(i) A hydrant of the fire brigade-pattern to be fitted at each end of each platform, and such hydrants to be provided with sufficient hose and $\frac{3}{4}$ -inch nozzle to reach the whole length of the platform and of the longest train in use on that particular line.

(ii) At least six buckets of water and six of sand to be available on each of the several platforms.

(iii) An extingisher to be supplied to each carriage and to each lift.

The following additional observations have been made by the London County Council:—

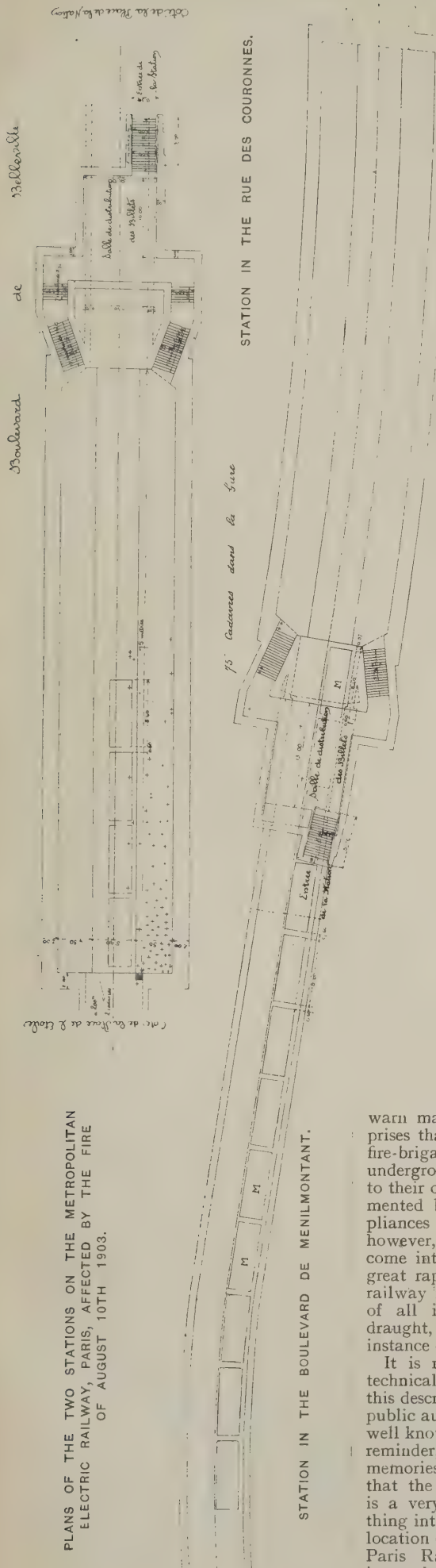
(B) It is recommended that provision should be made for—

(i) Some experienced person responsible to the owners of the railways to periodically inspect and report to the owners on the fire appliances and test the extingishers, and the owners to be responsible for the good order of all such appliances and for seeing that the railway staff is stationed and drilled.

(ii) All waste and dirt to be removed at least daily.

(C) It must be clearly understood that unless overcrowding in the lifts and carriages is prevented and the gangways of the latter

* The italics are ours.



PLANS OF THE TWO STATIONS ON THE METROPOLITAN
ELECTRIC RAILWAY, PARIS, AFFECTED BY THE FIRE
OF AUGUST 10TH 1903.

kept clear, the extincteurs in such lifts and carriages will probably prove to be useless in case of fire.

(D) It should be borne in mind that in the event of fire obtaining any hold in a "tube" railway the fire brigade could be practically of no avail, and, therefore, the railway authorities must rely upon their own resources.

The italics are ours.

The Fire on the Metropolitan Railway, Paris.

As we are touching upon questions of fire in underground railways, we publish two drawings showing the location of that sad calamity of the Metropolitan Railway tube fire in Paris in which so many lives were unnecessarily lost. The fire in question originated in the evening in a railway carriage in a tunnel of the Paris Metropolitan Railway between Menilmontant and Les Couronne stations.

The structural damage done was to tunnel, platforms, &c., and the destruction of some twelve railway carriages; but the serious aspect of this fire was the terrible loss of life. This loss of life revealed in a most terrible way how easily and rapidly such calamities can occur on electrical railways that are not suitably protected from the fire point of view.

Without going into gruesome detail, the main cause of the loss of life should be attributed to the fact that the principal platform of the Couronne station had only one exit at one end, and that the public, mistaking the route of exit, were blocked and suffocated at the other end. The positions in which the dead bodies were found is shown by the crosses on the plans. The smoke arising from the burning woodwork of the carriages, platform, &c., was of the most intense and suffocating character, as is generally the case where wood catches light under an electric arc.

There could be no question of the fire brigade coming into active operation, or in fact anything being done in the direction of fire extinguishing by that force, and thus this accident should

warn managers of electrical railway enterprises that they cannot rely upon tangible fire-brigade assistance in the case of these underground fires, and are practically left to their own fire-preventive resources, supplemented by their own fire-extinguishing appliances and organization, which latter, however, can also scarcely be expected to come into useful operation, owing to the great rapidity with which any underground railway fire makes a start and takes hold of all inflammable material when under draught, except perhaps in the very first instance of a minor outbreak.

It is not necessary to go over all the technical details of this fire in a journal of this description. To those they affect and the public authorities in particular they should be well known, but the plans, combined with this reminder, should suffice to bring it to the memories of all professional men concerned that the risk on all underground railways is a very real one, and that, taking everything into consideration, the conditions and location of the platforms in the Metropolitan Paris Railway were, if anything, rather better than on this side of the Channel.

THE LORD MAYOR ON FIRE SERVICE.

THE LORD MAYOR did a very excellent thing in the interests of the fire protection of the metropolis on December 10th, when he attended a meeting of the Private Fire Brigades Association at the Guildhall to see the competition for the Corporation's challenge shield (made by the Alexander Clark Manufacturing Co.), and afterwards present it to the winning team. There was an excellent attendance of competing teams from private brigades, who were put through a wet drill in the Guildhall yard and a surprise dry drill in the Guildhall. The Railway Clearing House team won the shield for 1904-05, Messrs. Nicholls & Clarke's team being an excellent second. The Lord Mayor and Sheriffs attended in state, together with the members of the City Lands Committee, and there were also present Captain Hamilton, R.N., of the London Fire Brigade, accompanied by Divisional Officer Gamble; Mr. E. O. Sachs and Mr. James Sheppard, of the British Fire Prevention Committee; Lieut.-Col. Fox, of the London Salvage Corps; Mr. Graham, of the National Fire Brigades Unions Benevolent Fund, and others closely associated with the question. There can be no doubt that "first-aid" in factories, works and large business premises is of the utmost importance, and the meeting did much to encourage efficiency and interest in the



SHIELD PRESENTED BY THE CITY
CORPORATION FOR COMPETITION BY THE
PRIVATE FIRE BRIGADES.

matter. There are a great many firms who could well take the Lord Mayor's words to heart and see that an emergency can be met and a fire kept in check on their premises until the official brigade arrives. The Lord Mayor said: "The competition which has taken place to-day for the first time in this ancient hall is indicative of the progressive spirit of modern business requirements within the greatest metropolis. In former days the citizens were content to rely upon the established fire-brigade organization, and their confidence was justified under the then existing circumstances, but the whole aspect of mercantile London has undergone a wonderful transformation within the last quarter of a century. In the place of modest business establishments well suited to the requirements of city life half a century ago, there have arisen Phoenix-like from the ashes of the past huge blocks of buildings in which are stored merchandise the value of which cannot be estimated by simple figures. In the matter of fire-protection and extinction it has been wisely said that the man on the spot is worth a dozen in the street at that

critical moment when a fire obtains a start in a great business establishment several storeys high. The value of private fire brigades as prompt and powerful volunteer forces, properly organized and equipped, has been recognized by almost every large employer of labour who is responsible for the lives of those placed under his daily control. Hence it is that the extension of the volunteer fire-brigade movement in London has been in accordance with the demands of the magnitude of modern business enterprise. The private fire brigades of the metropolis, whose leading members I have much pleasure in greeting this evening have proved their usefulness, nay, their necessity, as an efficient auxiliary to the splendid force of trained firemen we recognize in the officers and men of the Metropolitan Fire Brigade. There have been several notable occasions within the last few years when the members of the private fire brigades of London have administered "first aid" in the extinction of what might have proved disastrous fires in congested districts, and it is in that spirit of encouragement to future great efforts the Corporation of the City has offered this handsome shield for competition."

AMENDING THE LONDON BUILDING ACT.

The Fire Brigade View.

IN a report to the London County Council its Fire-Brigade Committee makes the following public statement as to the proposed Building Act:—

"We have had under consideration the Building Acts (Amendment) Bill, 1905, so far as it relates to fire protection and means of escape in case of fire, and we observe that nearly all the suggestions, which, after consultation with the late chief officer of the Fire Brigade and the present chief officer, we made to the Building Act Committee have been met in the Bill. These suggestions dealt mainly with (a) the means of escape from buildings above a certain height; (b) fire protection and means of escape in premises used partly as shops and partly as dwelling-houses, with special provisions as regards premises used partly as oilshops; (c) fire protection and means of escape in premises part of which consists of projecting shops; (d) buildings over 80ft. in height; (e) doors between buildings; (f) the storage of wood and timber and protection of neighbouring buildings; (g) the conversion of a dwelling-house into a factory, warehouse, &c.; (h) the division of one shop into two or more shops; (i) the pro-

tection of windows and openings of buildings within 30ft. of openings of other premises; (j) the protection of constructional ironwork; and (k) the construction of lift shafts. As a result of our consideration of the Bill we informed the Building Act Committee that we thought that the clauses with regard to projecting shops, the protection of windows and openings in buildings, and the protection of constructional ironwork should be retrospective after a certain period, and that the provisions with regard to the storage of wood and timber should be made more stringent in the case of timber yards adjoining dwelling-houses; but the Building Act Committee have not seen their way to make the necessary amendments. We are still of the opinion we expressed in the joint report of the Building Act, Fire Brigade and Parliamentary Committees, presented to the Council on 26th May, 1903 (pp. 924-5), that the need of further legislation with regard to protection against fire in, and provision of means of escape from, buildings is extremely urgent, and we therefore think that clauses dealing with the matters mentioned above should be proceeded with in the next session of Parliament."

A FIRE AND SALVAGE BOAT.

ON this page we illustrate a fire and salvage boat which has just been built by Messrs. Merryweather & Sons for the Manchester Corporation. It will be employed by the Manchester fire-brigade for the protection of property on the Ship Canal, and is the first boat of its kind supplied to a British fire-brigade. The boat is of a new pattern, the entire cost of the vessel and equipment being estimated at about £10,000. Besides being a fire float, it carries salvage pumps of enormous power with a capacity of over 18 tons of water per minute, enabling sunken vessels to be raised and floated, compartments to be pumped out, &c. The hull, which is of steel, is 90ft. long with a beam of 23ft.; it draws only 3ft. of water, and is divided internally by watertight bulkheads. The boat is fitted with twin screws, driven by two vertical compound steam engines. There are two boilers of the locomotive type, each of 600-h.p., each being capable of driving the whole of the machinery on board. The boilers are fed by two powerful pumps, arranged to take suction from the Canal or from tanks on board. The fire pumps are of Merryweather's patent "Greenwich" horizontal pattern as adopted by the Admiralty, and have a capacity of 4,000 gallons per minute. The deliveries are all connected to a large copper main pipe, which supplies

three large monitors, each capable of throwing a 3½in. solid jet, and also twelve outlets for hose. The two powerful centrifugal pumps, for salvage work, will deliver 5,000 gallons per minute. We should have liked to see some special fittings for rapid mooring of the boat, as our experience is that when monitors are at work and time prevent proper mooring, fire-boats have a nasty way of going where they are not wanted to, i.e., the steering gear becomes quite ineffective.

NOTICE.

PHOTOGRAPHS OF FIRES WANTED.

BOROUGH surveyors, insurance surveyors, fire-brigade officers and others are invited to send in photographs of fires for publication. Such photographs should comprise, if possible, a general view, but more particularly views of structural work and detail affected by fire. They should be accompanied by concise notes as to the fire, as far as practicable. Communications should be marked "Fire Supplement" and addressed to the Editor, BUILDERS' JOURNAL, 6, Great New Street, E.C.

Photographs of the following special subjects are particularly in request:—Iron doors, armoured tin-clad doors, windows glazed with fire-resisting glazing, structural ironwork protected by concrete, terra-cotta or plaster. Floors of concrete, terra-cotta or plaster slabs.

Photographs should not deal with fires earlier than January, 1903. Colonial and foreign photographs are equally welcome with British ones. Foreign photographs should be accompanied by particulars in either English, French or German, and not in any other language.

Particulars of Fires.

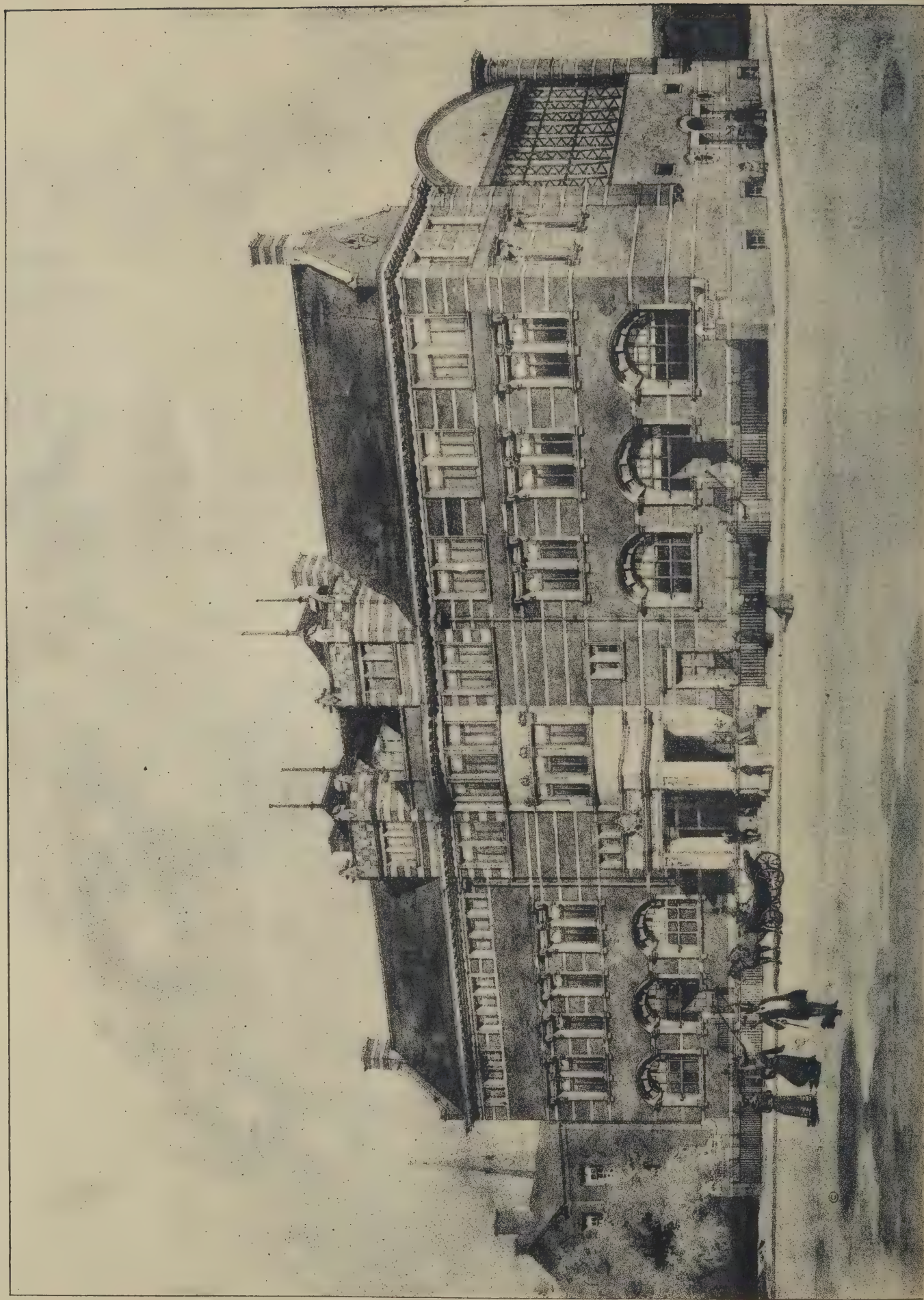
Authentic technical particulars dealing with fires are invited, more particularly where they deal with structural points of interest or questions of the efficacy or inefficiency of any special forms of structural work.

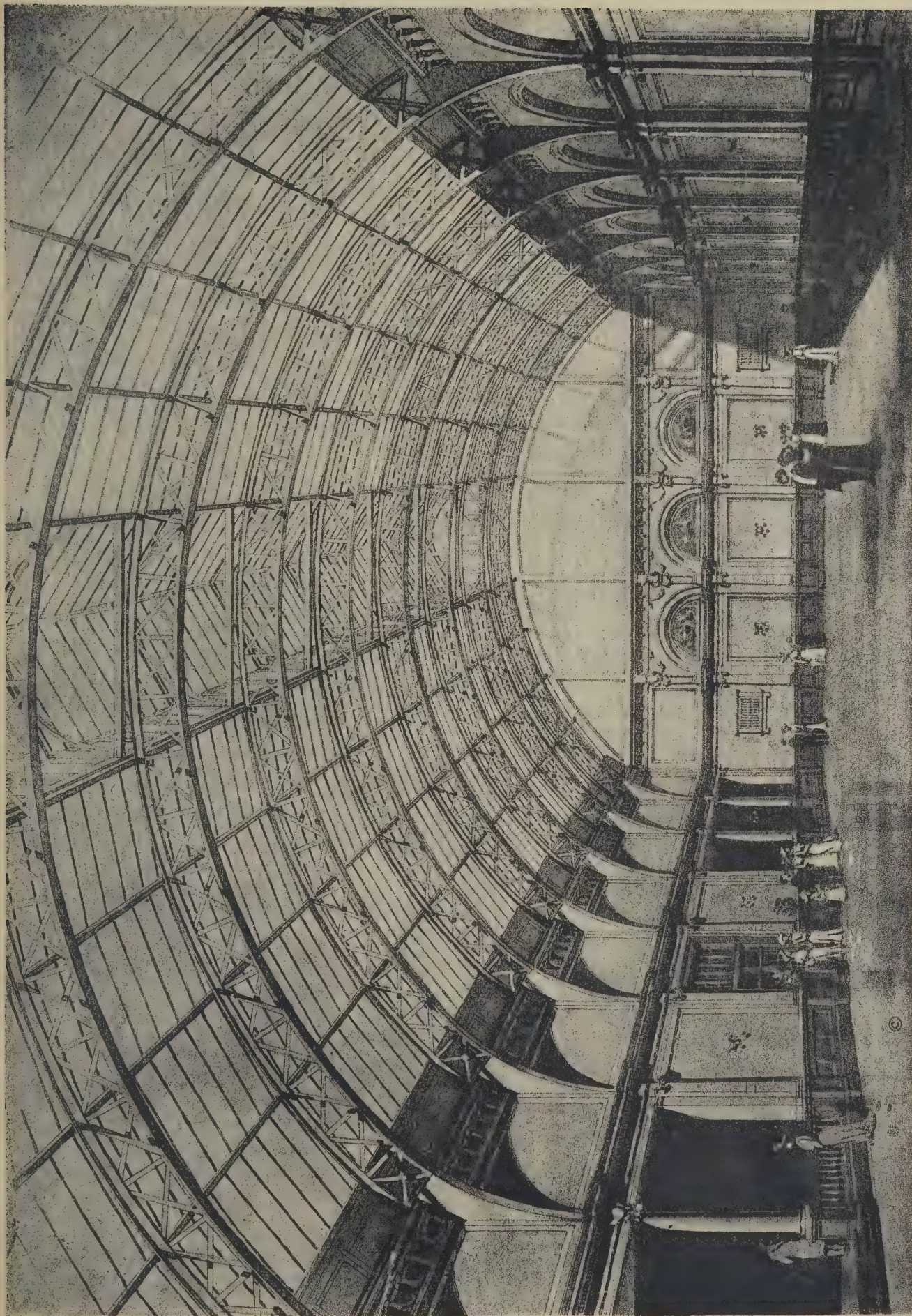
Mr. Hitchcock, late of the Geelong Fire Brigade, Australia, has most successfully arranged for the presentation of a challenge shield to the Australian fire service, to be competed for annually in Victoria. The necessary funds were subscribed at Mr. Hitchcock's initiative among citizens of London, and the very handsome shield was duly handed over to the Australian fire service by the Lord Mayor on the occasion of his visit to the private fire brigades competition at the Guildhall. The design of the shield is above the ordinary.



THE NEW FLOAT FOR THE MANCHESTER SHIP CANAL.

*Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, December 28th, 1904.*





SPOTTISWOODE & CO. LTD. LITH. LONDON.

NEW HALL AND OFFICES FOR THE ROYAL HORTICULTURAL SOCIETY, VINCENT SQUARE, WESTMINSTER. EDWIN J. STUBBS, ARCHITECT.

THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

December 28, 1904. Vol. 20, No. 516.

6, Great New Street, Fetter Lane, E.C.

MEN WHO BUILD.

Mr. PECKSNIFF, Junr.

"GOOD morning!"

"Good morning," Mr. Pecksniff, holding his tee-square defensively, gazed suspiciously at the intruder.

"Your achievements and accomplishments in the field of Art are so well known that I am commissioned to offer you —"

Mr. Pecksniff beamed; he also interrupted.

"Of course, of course," he said, "for that little charitable fund in which I am interested; well the flooring contract will be at least £500 and if you offer —"

"Pardon me; I fear there is some mistake."

"Some mistake!" he echoed sharply.

"But you represent —"

"THE BUILDERS' JOURNAL."

Mr. Pecksniff's face fell. "Oh—ah—yes, yes—THE BUILDERS' JOURNAL. What can I do for you?" *Sotto voce* he consigned all office boys to perdition. The opening was too good to be lost. "Mr. Pecksniff, the proud position you occupy, in the front rank of British architects, the genius which distinguishes your conception, the brilliancy of your intellectual attainments, entitle you to the privilege of an interview. For the benefit of the rising generation we entreat you to let us know a little of your struggles and difficulties before you reached your present eminent position." You, Mr. Pecksniff, as a successful man in the realms of Art —"

"Ah, yes, Art! What a fuss they make about Art. There are some people who say an artist must be born; some, even in these days of free education, consider Art a difficult Mistress. But there, it's as simple as easy when you know the rules. Look at our schools; look at our technical colleges; every year we are turning out artists by the thousand. British Art is now at its highest pinnacle, and I am proud and happy to say that I have done my bit in pushing it forward. What I say is, if you see a good thing push it along, as the poet says. Not but what some are more artistically gifted than others," he added, patting *La Petite Marie* complacently.

"Quite so—quite, quite so!"

"Of course one suits one's Art to one's custom—client," he went on. You mustn't cast pearls before—but you know the proverb. When one has *carte blanche*, of course one can give free reign to one's imagination. For instance, this room—"

He waved the details of the sanctum before our vision. Conscious of oppression we began dimly to understand the cause as our gaze took in the pea-green wallpaper with the pink satin stripe, and the peacock blue dragon wrestling with his yellow brother in the frieze. The Turkey carpet and the brass chimney-piece with *repoussé* copper trimmings harmonized well with furniture in which straight lines had no part. Without doubt it was an Art study, complete in every detail, even to the Benjamin West engravings in gilt frames. "One should always be artistic even in little things," pursued Mr. Pecksniff. "Look at this!" He jerked towards us a design for a

wall covering destined to line the interior of a lavatory—dark-blue Amorini caressing in a *field azure*. "Everything is to be *en suite*," said Mr. Pecksniff, interposing another design for a pedestal closet, whose basin and soil-pipe were knarled tree roots, the flush-pipe an upward growing orange tree, flanked with bunches of fruit, in whose clustered branches, concealing the cistern, there sat an owl. It was a masterpiece, and like some other masterpieces, it left us speechless. Our silence Mr. Pecksniff took for a compliment.

"These are only trivialities," he said. "They do not involve any mental effort; sort of thing you do with one hand tied behind you. But I have a little job here that I don't mind telling you has given me a bit of trouble." He fished out of a bureau some drawings for a church restoration. "This restoring business is a bit of a job at first; but I'm a dab hand at it now. Those old monks were all right in their way, you know; but their efforts were very cold and uninteresting. All this plain wall and decayed stone is a bit off. But see how I improve it. The new vestry is in red pressed brick with Bath stone dressings; that'll give a bit of tone to the East end. Then we're scraping down all the exterior so as to give a nice new even tint to the walls, and bands of bright red glazed tiles round the church will throw it up a bit. Here's the interior scheme—a bit tasty, isn't it? We gazed at a medley of wriggly stencil patterns over pale green and salmon pink backgrounds, with a dado of green glazed tiles. "Cool and restful, ain't it! The place is to be re-seated in light varnished pitch-pine, from my design. That'll make 'em sit up at the Institute, I bet." We ventured to agree that it would. "Such a lot of rot is talked about restoring," said Mr. Pecksniff, warmly, "and some of the beggars have begun to criticise me. Not that I mind criticism, you know; but it's a nuisance to be everlastingly heckled by fellows who know nothing about Art. People talk about repairing and not restoring. How on earth can you restore a thing if you don't repair it? And, besides, our old churches want livening up a bit. Look at St. Paul's now. The decoration there is a bit tasty, if you like. If only the dome spandrels had been done like the rest it would have been all right."

"And what about the modern home, Mr. Pecksniff?"

"Ah, the modern home. Well, picturesque is the keynote. Plenty of variety in the materials—the more the merrier. Plenty of ingle-nooks, gables, balconies, &c.—the picturesque jumble, in fact. I never build a house now without seven gables. Let them jut out all over the place. It makes the house look bigger, you know, and the man gets a £5,000 looking house for about £2,500. Then I've a very good line—I should say set of designs—for 'rough casts'—you know them?" and we nodded. "Sort of cross between a barn and a labourer's cottage. Very popular just now. They have the opposite effect. The £2,500 house looks worth about £500 from the outside."

"Having decided which style of house you prefer, we get to work very quickly. Of course, my clerks worry out the plans; I just

put in the finishing touches, which make the work of art. I've a very good plaster firm working for me just now. I just ask them for a Saracenic or Italian Renaissance ceiling, and the design is in my hands the following day. When I have approved of it, and put one or two touches to it, the thing is settled. Joinery and other details are worked out in the same way. It saves a lot of trouble, and gives the architect time to get a grip of the essentials."

"And what about the arrangement of the modern house, Mr. Pecksniff? Has it changed much?"

"Oh, that is quite different now. Shakespeare or Bacon, or someone, said something about a house being built to live in, not to look at, but we have progressed since then. In the modern house you take a hall, which must have at least eight corners and an ingle-nook. Arrange the fireplace close to the front door. On cold nights one appreciates this forethought, even if short-sighted people stumble over the curb occasionally. If it is thought desirable to have a hat-rack, it should be placed in the kitchen or behind the pantry door. Rooms may lead one into the other; I don't bother about that as long as I get them all in."

"And the bedrooms?"

"Oh, they come as they will. The arrangement of the gables makes them a bit awkward, and of course in some of them you will find it a bit difficult to stand upright. But then, what is a bedroom?"

At this point a clerk announced that the representative of an art metal firm was waiting. "Show him in," said the great man, and motioned to us to remain seated.

"Well?"

"Good morning, sir. I have come about those railings."

"Railings. What railings?"

"Those area railings, sir—Bayswater job."

"What are they wanted for?"

"I presume to keep people from falling into the area."

"Oh, ah, yes! I suppose we must have 'em. Well, what about them?"

"Any particular style, sir?"

"Oh, no! oh, no! Keep it all Roman!" Airily waving the traveller towards the door, Mr. Pecksniff turned to us. "I should like to have shown you some of my little fancies for supporting six-floor buildings on plate glass, but time presses."

"Before I go, a word to the student, Mr. Pecksniff, please?"

"Enthusiasm, and again, enthusiasm! It's a blessed word, like Mesopotamia, and I've never known any president who failed to avail himself of it. I use it myself when I address students; in fact it's expected of us. An address to students without the word enthusiasm in it would be like an egg without salt. Enthusiasm is the salt of life; it savours the sickly sweetness of success, and neutralises the bitterness of defeat." He drew himself up and fingered his fat watch-chain lovingly. "It is twice blessed; it blesses him who says it, because he is hard up for a better word; and it blesses him who hears it—"

But Mr. Pecksniff's eloquence and his wallpaper were too much for us and we fled.

MR. T. G. JACKSON ON STREET ARCHITECTURE.

BEFORE the Applied Art Section of the Society of Arts, last week, Mr. T. G. Jackson, R.A., read a paper on "Street Architecture." He said that when sweeping changes like those between the Strand and Holborn were being effected it was well to seek for and examine the principles that ought to govern street architecture. But those principles should not be kept for such occasions alone. It was also important that the true principles of street architecture, if they could be discovered, should be applied to individual as well as to general cases. There was nothing, for instance, but good principles to prevent any freeholder from building or rebuilding his house in some incongruous fashion which would spoil a whole street. One principle, then, which ought to govern street architecture was surely to have consideration for neighbouring buildings. Could any one view without dismay the appalling intrusions that were breaking up and destroying the design of Regent Street—the one fine and consistent piece of street architecture in London?

The first principle that he would lay down for town architecture was that there should be a consistency, a regard for the surroundings, an absence of vulgar rivalry in display; that ordinary houses should subordinate themselves to buildings which, from their public uses or their architectural importance, might fairly claim precedence.

Another consideration that arose, especially when there was a question of cutting through old towns and forming new thoroughfares, was that, when the alteration approached or touched beautiful buildings, whether old or new, those alterations should be designed to fit the buildings, and to bring out their beauties and enhance their architectural effect. With us this principle had rarely been thought of, and splendid opportunities had been missed, as, for instance, at Hyde Park Corner and Piccadilly Circus. Considerations of economy should not always be allowed to prevail over all other considerations. When unusual opportunities occurred of making a beautiful street, as, for instance, in the alterations of the Strand now in progress, it would be unworthy of a great capital to treat the matter solely from a commercial point of view. Something must be conceded to the dignity of a great city. A mistake made now from a too parsimonious motive would lay up a store of disgust and irritation in the future; and with such a mistake we were threatened in the case of the Strand between Wellington Street and the Law Courts. The new frontage lines as approved by the County Council signally failed to fit the lines of the churches of St. Mary and St. Clement and to bring out and enhance the architectural merits of those structures. The plan approved would have an accidental haphazard character, with none of the dignity given by regularity, and it was one in which the very elements of true architectural treatment were not so much neglected as deliberately rejected. In no other capital in Europe would the economical question have been allowed to prevent so grand and important a scheme from being carried out in the best way possible.

In the case of a street entirely new from end to end, like Kingsway, many difficulties were absent. This was particularly so in the matter of scale. The buildings that lined Kingsway might be as large as they pleased. But in the case of the Strand this was not so. The proper scale was given there by the two churches and by Somerset House, and the new buildings must conform to that scale if they were not to spoil the picture. Unfortunately this was not likely to be a consideration with either the London County

Council or the lessees of the new sites, if one might judge by the beginning that had been made. Perhaps it was not too late to induce the Council to fix a height for the Strand fronts properly proportioned to the scale of the old buildings which gave the Strand its peculiar charm. We did not want an "imposing effect," as the report of the Improvement Committee called it, on the north side of the Strand. Let the "imposing effects" be reserved for Aldwych and Kingsway; but even there it was to be hoped that megalomania would not be allowed to run riot. In hot countries, where the sun was an enemy to be shut out, narrow streets between lofty houses were reasonable. But in England the sun was a visitor who never or rarely outstayed his welcome, and we wanted as much of him in our streets as we could get. The houses of Regent Street and Oxford Street and of the untouched parts of the Strand were of the ideal height for our dim, murky London streets.

As to the best way of laying out street architecture on a general scheme, should it be treated as one whole, a single design to which every builder of a part must conform, or was the building line to be the only rule, and was all style, scale, and architectural treatment to be left to individual taste? Was the architecture of the street to be individual or collective, accidental or regular? There was much to be said for either alternative; but the unrestrained genius of the commercial architecture of to-day was to be regarded with misgiving. The result would probably be a competition in which every house would try to outshine its neighbour, by cramming on more ornament, overpowering them in splendour and overtopping them in height. Better far than this the monotony of Gower Street or the unloveliness of Wimpole Street. The tide of self-advertisement was rising. It had laid nine-tenths of our architecture at its feet. Art was supposed to consist in ornament, and ornament was valued according to its quantity, not its quality.

Perhaps the crucial difficulty of street architecture was the shop-window. In these days of display, it was thought necessary to abolish the front wall of the ground floor and to substitute huge sheets of plate-glass. The architect must reckon with these shop fronts, but how were they to be treated architecturally so as to be tolerable, or actually an element of beauty in a façade? To bring the new construction, consisting of two steel stanchions and a beam across, within the domain of art, it was only necessary that it should be visible. There was no reason why the stanchions and bresssummers should not be treated architecturally, instead of as now, being concealed, so that the building appeared to be supported on the edge of a plate-glass shop front. Until we made up our minds that, if we accepted the new mode of construction by iron, we must break definitely with the traditions of brick and stone there would be no hope for us.

A discussion followed.

Sir J. Wolfe-Barry said that the architect of the future must discard a great deal of what he had been taught of Roman, Greek and Gothic architecture, which was not suitable for modern commercial life. He must study steel and iron construction and see how it could be made artistic. There was no reason why steel and iron should not produce a beautiful and harmonious whole. It would be difficult to improve, for instance, on Southwark Bridge as an iron structure, and the great arches of Blackfriars Bridge were not unworthy of admiration. If the big shop-window was a necessity of modern street architecture, the trabeated form of construction was the only one which could adjust itself to the conditions. Until architects set themselves free from traditions which were not applicable to modern requirements, we

should continue to be confronted with bastard styles of construction, both ludicrous and unsatisfying.

Mr. Reginald Blomfield said that architects must look to civil engineers to teach them how to deal with iron and steel. In this country we had not yet a sufficiently high standard of taste to warrant the setting up of an artistic directory of control in architecture. But it was the absence of any definite principle in the designing of our streets that had led to some of the horrible fiascos of the London County Council.

Mr. Blashill (formerly architect to the London County Council) pointed out that taste changed radically in twenty years; and he thought that individualism ought to prevail over collectivism. If the public wished to have elevations to suit their taste, they would have to pay for them. When land was let by auction there was a limit to the restrictions which could be placed on designs. But if it were desired to have control over designs, why not let the land for a fixed sum, subject to the approval of the design, which thus would be seen before the bargain was completed?

Mr. Halsey Ricardo exhibited a design for a model street fulfilling modern requirements.

Mr. Mark Judge urged that there must be something wrong when land in such a position as that fronting on the Strand remained uncovered for months together.

Keystones.

"The Antiquary" begins a new and enlarged series with the issue for January, 1905.

A new Fresco at the Royal Exchange has been fixed in the ambulatory. It is by Mr. E. A. Abbey, R.A., and represents the settlement of the historic dispute between the Merchant Taylors' and Skinners' Companies for precedence during the reign of Richard III.

The Birmingham Architectural Association have made application that the General Purposes Committee of the City Council may receive a deputation in order that the claims of Birmingham architects may not be overlooked in regard to the municipal offices and art gallery to be erected in Edmund Street.

Cooking Apparatus.—Messrs. Benham & Sons, Ltd., of 66, Wigmore Street, London, W., have just secured the contract for the new cooking apparatus at the Hydro Hotel, Eastbourne, which is to be fitted up in the most up-to-date style. Messrs. Benham have just completed the whole of the cooking apparatus, laundry apparatus and hot water work at the Chesterfield Workhouse.

Extensions to the "Tube" are proposed to be made from the Bank to Liverpool Street Station, returning by loop and proceeding westwards *via* Ludgate Hill, Fleet Street, Strand, Piccadilly and Knightsbridge Road to Hammersmith. From this terminus the line would curve up, to meet the present one at Shepherd's Bush. The new line, however, would not be in working order for at least six or seven years.

The new Isolation Hospital for Chesterfield District was opened recently. It is situated at Penmore, near Hasland, and has been erected at a cost of £9,400. There are five blocks, about 20 yds. from one another, on an extensive site sloping gently towards the south. The administrative block is a three-storey building, providing accommodation for a staff of eight or nine nurses; the scarlet-fever block contains sixteen beds; the enteric fever block ten beds; a third block contains four beds, for diphtheria cases; whilst a fourth block is fitted up as a laundry for dealing with infected clothes. Mr. J. E. Balshaw, Southport, was the architect, and Mr. David Brown the builder.

NOTES ON BRICK AND TILE MAKING.—II.

By JOSEPH JOPLING, F.S.I.

(Concluded from p. 332, No. 515.)

NOW set about laying-out the site. This will, of course, vary in every case, but in all cases the problem before you is how to handle a great weight and bulk of material a great number of times at the least possible cost. Arrange that every time the material is handled it goes a step towards the point of despatch, that if possible it goes downhill—not up, that a step forward is not retraced, that the power is kept at one spot except for special purposes (for you can transmit it any reasonable distance very easily), that the area occupied by buildings and erections is kept as small as possible, that the office is in a position to control everything in or out, that a suitable house is provided on the spot for the manager or foreman, and cottages for at any rate the leading hands and burners.

Planning the Works.

Next decide upon the methods and processes to be adopted, plan the works, and select suitable kilns, dryers, machinery and plant. Real efficiency and real economy go together, and the best of everything will prove the cheapest. Do not be influenced too much by statements as to what is being done elsewhere; you want what is most suitable for the particular works in hand. Avoid unnecessary capital outlay, for if any considerable proportion of it proves unproductive you are at once handicapped unless you write it off at once, either contingency being unsatisfactory.

Any attempt to detail this work would be rather misleading than of practical use. Endless varieties of machines, plant, kilns, dryers, &c., are at one's disposal, and every case needs special treatment. As to power, you may use water, oil, gas, steam or electricity. In any case do it well; allow a margin for contingencies, be liberal in quantities, provide duplicates of all parts liable to breakdown, and do not reckon as regards output from machines more than five days as a working week all the year round.

With regard to quantities. As an illustration of bad management, I have seen wheeling plates dragged about the works for want of a few more. I call it buying them every week and never possessing them. Or you may see bricks piled on a badly-constructed floor, or hacks, with the result that every brick in the bottom rows, or 12½ per cent. of the total output, is spoilt, whereas a small outlay would prevent this.

An ideal works, from my point of view, would be worked continuously, preparing the material and making the goods by power, drying in mechanical dryers, burning in continuous kilns and despatching without road haulage. The ideal is seldom reached in all respects, but one may always strive to approach it as nearly as possible.

Transport of the Material and the Product.

Bearing in mind what the problem to be solved is, it follows that transport is an important part of the work. Dealing with that part appertaining to the manufacturing processes, we first of all have to get the material from the pit or face to the machines, pugmills, washmills, &c. This can be and often is done by barrows, but narrow-gauge tramways are far preferable.

The cost is not excessive, the economy in working is great, and they can be worked when all other means of transport would be stopped by bad weather. The same remarks apply to all the work, including conveyance of the green bricks to the sheds and dryers, afterwards to the kilns, and ultimately to the wharf or siding for despatch.

Even if the wharf or siding is a mile or more away, and it is possible to get there without going on to a public highway, it

will well repay you. I have many times succeeded in so arranging the tramways that all other kinds of haulage plant have been dispensed with, the result being a large saving and regular working. To detail the different systems is out of the question, but a few important points may be noted.

(1) Keep the gauge narrow, say 20 ins. to 24 ins. maximum. (2) Keep the road in good order. (3) Use handy-sized trucks that one man can handle: ½ to ¾ cub. yd. capacity is plenty; it is quite a mistake to try and handle big loads, for it will cost more per ton. (4) Have some trucks fitted with brakes. If a long distance to the siding, the brick trucks might be larger and a pony or cob will haul three or four. These should be fitted with brakes and with movable sideboards to bring back coal, sand, &c. In hauling up an incline from the pit or to machines, a friction hoist and wire rope will do it quickly and cheaply, even if there is a corner to turn. In some cases loaded trucks will haul empties in the other direction.

Trucks or cars for conveying the bricks, &c., through the various stages from the machines to the kilns will be of the pallet or rack type, varying according to the system adopted.

It is desirable to have the stacking ground, from which goods for local delivery by cart are taken, as near the high road as possible, to avoid cart roads on the works. If the raw material has to be got from a spot some distance from the machines, particularly if over a hill or across a valley, then I have found an aerial ropeway the most efficient and economical means of transport. In many cases this system beats tramways. Capital cost, maintenance and working compare favourably, very few supports are needed, and these occupy but little space. Another point is that the system interferes so little with the land it passes over that it can be adopted where a tramroad would be inconvenient.

For delivering bricks locally or to rail when a tramway cannot be utilized, horse haulage comes in, and after trying all plans I prefer one-horse carts carrying 500 ordinary bricks and made to tip. They can be used for coal, sand, &c., and are more handy for backing up to railway trucks, &c.

There are steam tip carts or vans, most useful for brickworks, &c., which will haul a load uphill and over roads that would kill horses. They deserve more attention than they have so far received. I am convinced that motor traction will soon supersede horses.

Haulage by traction engines I have found to answer exceedingly well if the conditions are suitable, but not when the roads are only fit to carry a hay-cart as a maximum load. If the distance from the works to the job is, say, 12 or 14 miles, traction haulage is best and cheapest, even if the railway goes from and to the places named, for you load at the stack and unload on the job; whereas by rail you handle the goods six times, and it is desirable to avoid handling clay goods wherever possible. Water carriage is the ideal way of transporting clay goods on rivers and canals, both as regards carriage and cost, but it is not always convenient for a consignee to accept bricks a whole freight at a time. There is often not room on the job, and delivery is wanted at the rate at which they can be used, yet unless cleared at once demurrage piles up. Apart from all other means of transport, we must depend largely upon the railways for delivering the bulk of the goods and bringing us coals, &c.

A good deal has been said as to the railway companies treating the traders badly. After years of experience all over the country, I can only say that I have invariably been treated fairly by them both as regards sidings and other accommodation, rates, claims, &c.

Management of Works.

Everything else being favourable, still much depends upon management.

There is no economy in low salaries. Do not rely so much on written references or the fact that the applicant has been half a lifetime in some one place or district, for he may be desirable there and useless to you. I would rather arrive at a decision after a day spent on the works than be influenced by reading a ream of testimonials. If the concern is a large one, pay a salary and a bonus, or extra remuneration for all goods sold at a better price than the usual average.

Or you may get a contract manager to make the goods at a price. If this plan is adopted, pay a fair price, insist on the standard being maintained and the work carried on in a smart orderly way. By way of encouragement give a bonus, as before-mentioned.

I have had scores of millions made by contract with satisfactory results to all parties, but of course there is a risk, for you must find wages, and if there is a loss it is seldom recoverable. In works of more moderate capacity either of these plans may be adopted. If the manager does not contract, you of course adopt piecework wherever possible. If he does contract, he should undertake for the agreed price to provide all labour not only for the actual production of the goods from stripping the turf to loading the finished goods, but for keeping in order the works, roads, kilns, plant, &c. The owner would of course provide everything needed in good order, not only to start with, but for extensions, renewals, &c., also all materials for repairs. Unless this is done you will find that the weekly day-work sheet will stagger you. I have tried all plans and found the foregoing the best.

Do not omit to insure against employers' liability from the very first, also against risk of boiler explosion and fire. It is worth the premium to have the boilers examined and reported upon.

If the concern is quite a small one, or on a landed estate, you may either have a working foreman at a salary and bonus, and adopt piecework, or a working contract foreman, on the same lines as for a larger place. In these cases the foreman should keep the delivery-ticket book, and the estate office the accounts.

In any case, provide the manager or foreman (according to his status) with a house upon or close to the works. This is most desirable; also that housing should be provided at any rate for the leading hands and burners. I have found it best to charge a moderate rent for the latter (including coals if on the works); the former are usually housed free of rent.

Supervision, Stocktaking, Book-keeping.

Close careful supervision and continual checking are imperative in clayworking, for there are many points of leakage.

No matter how capable and honest the employees may be (and although I have had some bitter experiences I am not one of those who look upon everyone with distrust), a complete system of checking, accountancy and audit should be arranged for. Occasional supervision from an outside independent source is very useful. Take stock at least once a year and have it taken by a capable and disinterested person.

Every single piece of goods, even samples leaving or used upon the works, should be entered on the ticket book and a record kept of anything received. Check and cross-check all the material won on the spot, handled, or received from outside sources; also haulages against one another, and against the product and leakages if they are discovered. For instance, if you buy a thousand tons of coal and find you have paid for hauling twelve hundred tons, it indicates that there is something the matter. Correct accounts will also prevent, in the case of leaseholds, disputes as to the royalty payable.

As regards depreciation of the freehold

itself, this will vary in every case; in certain cases there is none. As to kilns, dryers, buildings, machinery and plant, I find the best plan is to properly maintain the whole out of revenue, including renewals of worn-out and damaged parts. This plan is far less costly in the end, and preferable to writing-off a percentage.

Transfer of Land for Clayworking.

In transferring land for clayworking, whether by public auction or private contract (if freehold), or by sale or leasing, if leasehold, great care must be exercised by both sides.

If freehold, price is of course of first importance to both parties, but the vendor should see that he is relieved from responsibility as to possible nuisance, &c., that the rest of his estate (if any) is not likely to be depreciated in value by the claymaking operations or by the prevailing winds carrying fumes to the mansion, or that they will cause inconvenience or annoyance in any way. Proper attention must be paid to questions bearing upon access, extension, wayleaves if required, easements, &c. Let the price be reasonable and the statements made be framed on practical lines.

It is quite a common thing for such properties to be described as containing so many acres of splendid material, so many feet deep, which will make so many millions worth such-and-such a royalty, and therefore worth a certain sum. It is nothing of the kind, and such statements may only provoke a smile and reveal the fact that those dealing with it have no practical knowledge of such work. 30ft. below normal level is the maximum profitable depth of working for ordinary bricks, and the fact that the material is 300ft. deep does not increase its value.

Much of the value is latent and is to be created by the capital and brains of those working the material. Even then the extra value only extends to the output, and if the output is five millions a year the fact that there is a deposit of material sufficient to make 500 millions a year goes for nothing. On the other hand, if the material is good and can be worked, it is worth a price in excess even of building land. Roughly, 1 acre 1 yd. deep will make 2 millions of ordinary bricks; 10 yds. deep, 20 millions. This, at 1s. only per 1,000, comes to £1,000 per acre, not of course realizable at once but over a term of years.

In dealing with leaseholds even more care is needed, for the difficulties are continuous and lead to much friction. Leases are sometimes drawn with clauses which are practically impossible, and the results are often deplorable. Both parties should stick to the conditions of the lease, although the more usual plan is to let things slide. All the circumstances bearing upon the matter must be carefully considered and the royalty fixed accordingly.

The operations may not reduce the value of the land for accommodation, building or other purposes at all. For instance, if the land has a hill or hump of clay upon it, or it slopes up from the road level, then it is actually improved by the clayworking operations. The same thing applies where, as in the west of London, hundreds of millions of bricks have been made from a shallow top stratum of brick-earth not more than 4ft. or 5ft. deep, and leaving the land better fit for building. Yet the position was so good that £5 per acre and 2s. 6d. royalty was paid under leases, whilst from 20 per cent. to 40 per cent. of imported material, ashes, chalk, sand, &c., would be used and no allowance off royalty made. Such conditions bring large profits to the freeholders.

On the other hand, the contrary may be the case if the land dealt with is approximately level with the surroundings, for then a deep and unsightly hole is left fit for nothing but a chute and seldom suitable for

building upon, but we must bear in mind that the lessee pays not only a rent for the use of the surface but by way of royalty for the freehold also. It goes without saying that a desirable lessee should not only be a capable man but have capital enough to start and carry on the works until sales result in the regular way. If sales are forced to get funds, things soon go wrong.

It is seldom advisable for owners to finance lessees; they had better work the place themselves than do so.

Let the minimum royalty payable the first year be low, for there are sure to be hitches. To ascertain the royalty payable the first year take deliveries as ticket-book and add the stock in hand. In subsequent years take deliveries, plus stock, less stock in hand at commencement of the year. I have found Midsummer and Christmas convenient times for paying rent and minimum royalty, Christmas for the additional royalty.

The lessee generally pays all rates and taxes, but land tax, should be apportioned.

Dryers and Kilns; Fuel Consumption; Nuisance.

Dryers and drying sheds are all heated artificially by steam (live or exhaust), hot water, hot air, waste gases from kilns, or by furnaces specially provided. How the heat shall be applied depends entirely upon the form of dryer or shed. One must be guided by circumstances as to which system will answer the purpose best, particularly as regards tender clays. For high-class goods, sheds heated by small-bore hot-water pipes, with the goods on racks or shelves, answer well.

For facing bricks and odd stuff, the goods may be hacked up on the hot floor or racked on pallets.

Ordinary plastic bricks in many cases may be taken from the machines and hacked on the floor or on pallets and rack cars, by tramroad—(to the tempering chamber if a tender clay)—otherwise direct into a tunnel dryer, where they are subjected to a temperature gradually increasing from the entrance to the exit end at a speed varying according to what the clay will stand. Upon emerging they go direct to the kiln. This system is the acme of rapidity and economy, and saves handling, but is not always practicable.

As to kilns, they range from the old-fashioned Scotch kiln, through a large variety of intermittent kilns, to the latest regenerative fire, continuous kiln, which last will burn, with economy and regularity, the very highest class of goods. The Scotch kiln is simply a rectangular erection, with brick sides and ends, earth bottom, open top, hatchways at each end and firing holes, without grates, along each side. Millions of the best of bricks have been burned in these kilns. They need a good burner, who by manipulating the fires and earthing in the top will put the fire where it is wanted. Length is immaterial, but sixteen fire-holes on each side is as much as a burner can properly control. Such a kiln holds about 90,000 bricks. Correct height and width inside is important, and the position of the fire-holes more so. It takes three weeks to set, steam, burn, cool off and draw these and most other intermittent kilns. They are not as a rule used in winter, and even in summer rain and wind play havoc at times. None of the kilns yet invented produce finer burnt bricks than these, but the coal consumption is very heavy—8 to 11 cwt. per 1,000.

Other intermittent kilns are covered in, such as Newcastle, Irish, Stourbridge, Staffordshire, Fareham, Suffolk, dome, down-draught, bee-hive and many others, and are largely used. The coal consumption is much less—5 to 8 cwt. per 1,000. Some of them may be built within a shed, used for working and drying, and thus are available in winter.

They are fired by furnaces on the outer

walls. Some up-draught kilns have "dead-horses" of brickwork, upon which the goods are piled or set. In others the horses are formed each burn with common bricks. Down-draught kilns have either a flash wall all round inside or pockets round each furnace to divert the flame upwards, after which it descends through the goods and the floor into flues connected with the chimney stack, which may be used for one or several kilns. One objection to dome kilns is the large space in the upper part not occupied by goods, heat being thus wasted.

The first continuous kiln was the Hoffman, which secured at one bound the fullest economy in fuel, but as a rule the Hoffman pure and simple was not a success here, and I could tell some strange tales about this kiln. The main objection was as to the quality and colour of the product and the heavy cost of construction and maintenance. The next thing was to improve the Hoffman while retaining its economy of fuel consumption. A number of schemes have been tried and great strides have been made in the desired direction, and to-day there are a number of kilns having different names and protected, many of them by patents, that will burn all ordinary kinds of bricks in a regular and satisfactory way on a coal consumption practically as low as the original Hoffman—about 3 cwt. per 1,000 bricks.

For facing and ornamental bricks we have patent kilns, called regenerative fire-continuous kilns.

All these latter kilns are operated continuously in all weathers, and should be enclosed and roofed in above the firing floor, and there should be a covered-way all round the kiln at ground level. The firing is done from above, and coals should be delivered on a covered stage, level with the firing-floor at the end (both ends, if possible) of the kiln.

A friction hoist fixed on or under the stage will pull the tip-trucks up a tramroad easily. Once on the stage, the burner and his mate should handle them. It is not desirable to continue the tramroad on to the firing-floor, but to use barrows and iron wheeling plates and put the coal fuel where it is wanted.

All the flues of these kilns, of course, deliver the waste gases (unless diverted for some purpose) into the main chimney shaft, which, to give sufficient draught, must be of considerable height, 90ft. say as a minimum. One may dispense with a shaft and employ the induced draught system, consisting of fans driven by power erected in any convenient position and drawing the gases from the kiln and delivering them to dryers or direct through a short shaft into the atmosphere. This is a good plan, and the capital outlay is much the same in either case, but the fumes are more likely to be objectionable delivered at 20ft. above the ground than if carried roof top.

I have already said that clamp-burning produces fumes that at the least are unpleasant. Kilns using coal are almost free from this objection, but it is not unusual for a kiln shaft to be an annoyance.

Speaking of kilns, there is a patent continuous gas-fired kiln that has for a long time done well in burning firebricks, stoneware pipes and the like, and for such purposes, where high temperature and perfect control are desirable, is I think deserving of more attention than it gets. The gas is generated on the spot, and the cost per 1,000 is very low as compared with coal.

To-day still other new kilns, new systems of drying and burning, and even new kinds of brick (those made from lime and sand), are being put before us. We must watch and learn, and adopt them if they are a real improvement, not abandoning the substance for the shadow, but, on the other hand, not keeping in the old rut if it is possible to find a better road.

Law Cases.

Plans of Rural Cottages.—At the Lewes Petty Sessions recently Sir William Grantham was summoned by the Chailey Rural District Council for erecting certain dwelling-houses on his estate at Barcombe, Sussex, without having complied with clauses 45 and 46 of the by-laws made by the Council and confirmed by the Local Government Board. Counsel for the prosecution explained that the Chailey by-laws were founded on the Model code for rural districts, were published in 1903, and that clause 45 required notice of intention to build, plans and sections of the proposed building to $\frac{1}{4}$ th scale, indicating so far as necessary to show compliance with the by-laws the position, form and dimensions of the building, and of every water-closet, ash-pit, cesspool, well, damp-course and level of lowest floor, together with a description, in writing, of the proposed mode of drainage and means of water-supply and a block plan to a scale of not less than 1 in. to every 44 ft. showing the position of the buildings and appurtenances immediately adjoining, together with the width of the street, if any, in front, and intended lines of drainage, size depth and inclination of each drain, and arrangements for ventilating the drains. Sir William Grantham had commenced the erection of a cottage without submitting plans, but being requested to do so, he complied. These plans, it was said, did not conform with the by-laws, and the council finally submitted them to the Local Government Board, which body intimated that it had no authority to determine questions as to the administration of the by-laws in individual cases; but the president, Mr. Walter Long, in his private capacity expressed the opinion that it would not be necessary to reject Mr. Justice Grantham's plans when certain defects had been remedied. Amended plans were prepared, but the Council still considered that they fell far short of complying with the by-laws. "Indeed, the plans were pronounced to be quite unintelligible; windows and fireplaces clashed, and no drains were shown." Counsel then criticized the plans in detail. There was nothing to show where the fireplaces were to be, except that one was left to infer that one was to be placed above another. The front door was intended to be 2 ft. 8 ins. wide, but unless it opened outwards there was insufficient space to receive it. The staircase leading to the first floor was directly opposite the front door, but no corresponding staircase was indicated on the next floor; and if a staircase of the same width were put up, the space in the top room would be reduced to a width of less than 3 ft.—quite insufficient for a habitable apartment. These instances afforded a sufficient illustration of what the plans were like. They did not show the details by means of which the by-laws were to be complied with. The block plan did not comply with any of the requirements, with the single exception that it showed there were other cottages behind.—Mr. Robert Williams, F.R.I.B.A., said he could not have erected a building from Sir William Grantham's plans. In no respect did they comply with the by-laws.—Mr. Samuel Denman, M.S.A., of the firm of Denman & Matthew, architects, of Brighton, thought the plans did "indicate, so far as may be necessary to show compliance with the by-laws, the position, form and dimensions of the building about to be erected."—The chairman of magistrates said: "The plans in this case are admitted to be rather roughly and hastily put together. Have you ever seen similar plans adopted as satisfactory either by a public body or a private landowner?" and in reply Mr. Denman said: "No," and agreed that it was usual in these cases to submit plans drawn with more or less technical

skill.—Mr. H. C. Card, architect and surveyor, of Lewes, thought the plans indicated an intention to comply with the Council's requirements.—Mr. A. H. Stenning, F.R.I.B.A., of London, considered Sir William Grantham had sufficient technical knowledge to prepare the plans of a labourer's cottage, and that he had complied with the by-laws, only failing in not providing plans for the two upper floors of the cottage.—A number of other witnesses gave lengthy evidence.

Last Thursday the magistrates announced the result of their deliberations. The chairman stated that the "finding" had been arrived at with one dissentient. The Bench found that Sir William had complied with five by-laws alleged to have been infringed, but had not sufficiently complied with fifteen others. In other respects, the Bench found that the defendant's plans generally complied with the by-laws, and, although deficient in some minor particulars, they considered that this was to some extent excusable, inasmuch as the by-laws did not require plans to be prepared by experts. On the other hand, they considered that local authorities (such as the prosecutors in that case) upon whom was cast the duty of looking after the important interest of public health in their district should receive the assistance of individuals in carrying out their duties and were entitled to expect intending builders to submit plans capable of being more easily understood than those submitted by the defendant in this case. It seemed to them that, although the by-laws did not say so, the plans should be prepared, as one of the defendant's witnesses said, "with some technical skill," and if the draughtsman had not himself that skill he should call in the assistance of some one who had. At the same time it seemed to the Bench that the defendant's plans were intended by him to indicate that the buildings he proposed to erect would conform to the by-laws, and if he had failed in some particulars it had been due to misapprehension for which he was not wholly responsible. In the circumstances of the case, therefore, the Bench hoped that it might not be necessary for them to give a more definite decision. They were not without hope that the terms of their finding might have some effect in putting an end to what they regarded as a most regrettable dispute. In reply to counsel for the defence, the chairman said if pressed they could give a decision but hoped it would not be necessary. The Bench decided that the submission of the plans to the Local Government Board was not an arbitration.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication

Pearson's London Churches.

PORTISHEAD.—B. E. C. writes: "Kindly give the names and situations of churches erected in or about London by the late J. L. Pearson."

The following are the best known churches erected in or about London by the late Mr. J. L. Pearson:—Holy Trinity, Vauxhall; St. Peter's, Vauxhall, and schools; St. Augustine's; Kilburn. St. John the Evangelist, Red Lion Square; St. Michael's, Croydon; St. John's, Upper Norwood, and the Catholic Apostolic Church, Maida Vale. He also restored the upper part of the north transept,

Westminster Abbey, and completed some restorations in Westminster Hall. M.

R.I.B.A. Preliminary Examination.

HULL.—W. F. writes: "I am an architect's pupil and propose going in for the above examination. I have attended the Hull Technical School for engineering courses, which of course do not include languages, history, &c. Would it be possible to be exempted from the above by getting a satisfactory letter from one's late headmaster, and sending up four sheets of drawings?"

If four good sheets of drawings are submitted, exemption will be given from the drawing subjects, but it will be necessary to sit for the examination in all others.

G. A. T. M.

Dry-rot.

Mr. James B. Harris, of Newcastle-on-Tyne writes: "Referring to 'F. S. I.'s reply on p. 307 of your issue for December 7th, I have used mercuric chloride, about 1 to 8 gallons, water, to stop dry-rot for about sixteen years, and with very great success. Two large churches which I treated with it respectively eleven and seven years ago have shown no signs of recurrence of dry-rot, but in applying the solution care and patience are required. The underside of the wood, and the ground walls, &c., must first be carefully cleaned of all spores before applying it and (most important) the work must be examined and treated where necessary during the next twelve or eighteen months to thoroughly stamp out the disease. At the same time adequate ventilation is imperative."

Adjoining Owners.

EARLESTOWN, LANCs.—J. A. B. writes: "A has a plot of leasehold land (999 years) adjoining a plot held by B. B has a window overlooking A's land, 3 ft. distant from his boundary, contrary to his lease, which states that B must have no lights on his northern boundary nearer than 6 ft. What course should A adopt, and how long must elapse before B can claim right of light should no action be taken by A? B has also encroached 3 ins. with the stumps of a fence on A's land. How long must elapse in this case before B can claim possessory right?"

So much depends upon the exact wording of the leases that no satisfactory answer can be given to this query, which ought to be put before a reputable solicitor, to whom the whole facts of the case could be clearly stated. M.

Payment for Road Works.

CHESTER.—STUDENT writes: "I have a piece of land which is let out as hoarding on the front and sides, but not built upon. The road on one side has for years been the way to tramway sheds, but has always been in a rough state. The corporation have now paved and flagged the road and made it into a street, and want me to pay for the part included in my land, i.e., half the road. Is it not the law that payment cannot be enforced until the land is built upon?"

The fact that your land is unbuilt upon has nothing to do with the question of your liability to pay for the portion of road which corresponds to the frontage of your property. Neither in the "Public Health Acts" nor in the "Private Street (Works) Act" does any such qualification occur, and I am of opinion that (provided the corporation have carried out this paving and metal-ling in accordance with their legal powers) you can do nothing but pay the proportionate cost which is asked for. Of course if they have not observed the statutory conditions by which they are enabled to do this kind of work, and, having simply made up the road because it leads to their tramway depôt, now ask you as an adjoining owner to contribute, the case is very different, and you are not liable. This, however, I think to be a very unlikely proceeding upon their part.

F. S. I.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Dec. 29	Bradford, Manchester—Alteration, &c., of Police Station	Guardians	Worthington & Sons, 46 Brown Street, Manchester.
" 29	Cadleigh, Devon—Rectory, &c.	Rev. W. French	E. H. Harbottle & Son, County Chambers, Exeter.
" 29	Coleraine, Ireland—School	Urban District Council	W. & M. Given, Diamond, Coleraine.
" 29	Tonypandy, Wales—Chapel	Committee of Moriah Chapel	J. Rees, Pentre.
" 29	Northampton—Block at Hospital	Corporation	A. Fidler, Guildhall, Northampton.
" 29	Glasgow—Buildings	Corporation	City Engineer, 64 Cochrane Street, Glasgow.
" 29	Swindon—Extension to Electricity Works Buildings	Corporation	H. J. Hamp, Town Hall, Swindon.
" 30	Hull—Basement, &c.	Property Committee	J. H. Hirst, Town Hall, Hull.
" 30	Whitland, Carmarthen—Shops, &c.	Welsh Calvinistic Methodists	W. Phillips, Paris House, Whitland.
" 30	Glyn-Neath, Wales—Chapel	Education Committee	Jones & Morgan, Victoria Chambers, Pentre, Rhondda.
" 30	Lochalsh—Erection of School	Education Committee	William Mackenzie, Architect, Dingwall.
" 31	Humanby, Yorks—Council School	Education Committee	Clerk of Works, Beverley.
" 31	Maes-evan, &c., Wales—Farmhouses	Liddesdale District Committee	D. Jenkins, Architect, Llandilo.
" 31	Newcastle, N.B.—Fever Hospital	Mr. Troke	A. Inglis, 12 Bridge Street, Hawick.
" 31	Exeter—Shops, &c.	Halifax Commercial Banking Co.	R. M. Challice, 14 Bedford Circus, Exeter.
" 31	Hull—Banking Premises	Halifax Commercial Banking Co.	J. Watson, Cogan Chambers, Bowalley Lane, Hull.
" 31	Llanbradach, Wales—Room (Billiard and Bagatelle)	—	W. Phillips, Rosemount, Llanbradach.
" 31	Pierceobridge, near Darlington—Enlarging School	—	P. Caltrick, The Green, Pierceobridge.
Jan. 2	Liverpool—Flooring, &c., Dining-hall	Select Vestry	Parish Offices, Brownlow Hill Liverpool.
" 2	London, N.—Fire-brigade Station	Horseay Town Council	E. J. Lovegrove, Municipal Offices, 99 Southwood Lane, Highgate.
" 2	West Chiltington, Sussex—Additions to "Elephant and Castle."	King & Sons, Ltd.	C. H. Burston, 6 West Street, Horsham.
" 2	Bradford—Alterations to Library	Corporation	F. E. P. Edwards, Whitaker Buildings, Brewery Street, Bradford.
" 2	Blackwood, Mon.—Twenty-five Houses	Plass Road Building Co.	W. Dowdeswell, Architect, Treharris.
" 3	Londonderry—Schools	Select Vestry of Christ Church	R. E. Buchanan, Castle Street, Londonderry.
" 3	Belfast—Room, &c.	Guardians	Young & Maczensee, Engineers, Belfast.
" 3	London, N.—Alterations, &c., to Press House	Joint Drainage Committee	W. H. Prescott, Coombes Croft House, 712 Tottenham High Road, N.
" 3	Wisbech—Alterations to House	Education Committee	H. F. Simpson, County Surveyor, Wisbech.
" 4	Buxton—Milnthorpe Homes	—	W. R. Bryden, F.R.I.B.A., Buxton.
" 4	Felixstowe—Coach-house	W. G. Clarke	H. W. Buxton, 26 Hamilton Road, Felixstowe.
" 4	Middlesbrough—Erection of West Wing to School	Education Committee	Lofthouse & Sons, 62 Albert Road, Middlesbrough.
" 4	Dewsbury—Wesleyan Sunday School	—	Dalvey & Simpson, 73 Albion Street, Leeds.
" 4	Radcliffe-on-Trent—Shops	Co-operative Society	Calvert & Gleeve, Low Pavement, Nottingham.
" 4	Long Eaton—Ten Houses	Urban District Council	E. B. Ridway, Main Street, Long Eaton.
" 4	Newhaven, Sussex—Hospital	Commissioners	F. J. Rayner, 34 Meeching Road, Newhaven.
" 4	Sunderland—Taking down Old Post-office and erecting New Building.	—	Henderson & Hall, 28 John Street, Sunderland.
" 4	Dublin—Annexes	Guardians	Mr. Morris, 53 Cabra Road, Dublin.
" 4	North Dublin—Ten Labourers' Dwellings	Rural District Council	Mr. Morris, 53 Cabra Road, Dublin.
" 5	Carmarthen—Repairs to Schools, &c.	Education Committee	W. D. Jenkins, Shire Hall, Carmarthen.
" 5	Sheffield—Fittings	—	Gibbs & Flockton, 15 James' Row, Sheffield.
" 6	London, S.W.—Post-office	Commissioners	J. Wager, Office of Works, Storey's Gate, S.W.
" 9	London, S.E.—Stables, &c.	Lewisham Borough Council	Surveyor, Town Hall, Catford.
" 9	Hale, Cheshire—School	Education Committee	J. Howarth, Education Offices, Market Street, Altrincham.
" 9	Walthamstow—Alteration, &c., to School	Education Committee	H. Prosser, Committee's Offices, High Street, Walthamstow.
" 9	Sunderland—New Offices	Water Co.	W. & T. R. Milburn, 20 Fawcett Street, Sunderland.
" 9	Strathaven—Station-master's House	Caledonian Railway Co.	Engineer to Company, Buchanan Street Station, Glasgow.
" 9	Rathdrum—Residence and Dispensary	Guardians	G. F. Moore, 1 and 2 Foster Place, College Green, Dublin.
" 10	Shaldon, Devon—House	Mr. J. Harvey	S. Segar, 24 and 26 Union Street, Newton Abbott.
" 11	Loughlinstown, Ireland—Nine Cottages	Rathdrum No. 2 R.D.C.	P. Cuniam, Clerk, Loughlinstown.
" 11	Treharris, Wales—School	Merthyr Tydfil U.D.C.	J. L. Smith, 67 High Street, Merthyr Tydfil.
" 11	Wimbledon—School	Education Committee	R. H. S. Butterworth, Council Offices, Wimbledon.
" 12	Cork—Forty-six Houses	Town Council	City Engineer's Office, Municipal Buildings, Cork.
" 12	Kilkenny—Thirty-three Cottages	Rural District Council	Clerk to Council, Kilkenny.
No date	Terrington St. Clement, Norfolk—Pulling Down Old Buildings and Erecting New.	—	L. F. Eagleton, King Street, King's Lynn.
"	Woodhouse, Sheffield—Church, &c.	Primitive Methodist Connexion	J. P. Earle, Norfolk Row, Sheffield.
ENGINEERING:			
Dec. 29	Waterloo, Lancs—Fire-engine	Urban District Council	F. S. Yates, Town Hall, Waterloo.
" 29	London E.—Lift	Guardians	J. M. Knight, 35 Bancroft Road, Mile End Road, E.
" 30	Sunderland—Cooling Tower	Corporation	J. F. C. Snell, Town Hall, Sunderland.
" 30	Hanley, Staffs—Sewage Distributors	—	Wilcox & Raikes, 63 Temple Row, Birmingham.
" 31	Drogheda—Heating	Camberwell Borough Council	Town Clerk, Courthouse, Drogheda.
Jan. 1	London, S.E.—Electric Bells, &c.	Corporation	W. Oxtoby, Borough Engineer, Town Hall, Camberwell.
" 1	London—Engineering Work	Urban District Council	Engineer's Office, Public Health Department, Guildhall, London.
" 2	Mansfield, Notts—Sewerage Works	Public Libraries Committee	Messrs. Hodson, Engineers, Loughborough.
" 2	Hull—Electric Lighting	Drainage Committee	J. H. Hirst, Town Hall, Hull.
" 3	London, N.—Pumping Main	Corporation	W. H. Prescott, Coombes Croft House, 702 High Road, Tottenham.
" 3	Manchester—Sludge Main	Convalescent Home	H. A. Johnson, 15 Exchange, Bradford.
" 3	Odey—Waterworks	Great Western Railway Co.	Kennedy & Jenkin, 17 Victoria Street, S.W.
" 3	London, W.—Conductor Rails, &c.	Rural District Council	F. Redman, 34 Wood Street, Swindon, Wilts.
" 3	Cricklade, Wilts—Waterworks	Drainage Committee	P. S. Murphy, Coombes Croft House, 712 High Road, Tottenham.
" 3	Tottenham—Engine Beds, &c.	Education Committee	W. D. Jenkins, Shire Hall, Carmarthen.
" 5	Carmarthen—Sinking Well, &c.	Urban District Council	A. McCobban, Horne Street, Scunthorpe.
" 6	Scunthorpe, Lincs—Waterworks	Urban District Council	E. J. Harvey, Surveyor to Council, Ventnor.
" 6	Ventnor, Isle of Wight—Pier Repairs	Rural District Council	C. H. Fry, Clerk, Erith.
" 9	Erith, Kent—Tramway Equipment	Public Health Committee	S. Segar, Union Street, Newton Abbott.
" 10	Newton Abbot, Devon—Reservoir	Urban District Council	Town Clerk, Town Hall, Belfast.
" 12	Belfast—Boilers	Corporation	Council Offices, Church Hill, Bettws-y-coed.
" 12	Bettws-y-coed, Wales—Waterworks Extension	Corporation	Davis & Soper, Agents to Municipal Corporation, Port Elizabeth, S.A.
" 16	Port Elizabeth, S.A.—Electricity Supply Works	Asylums Committee	Gas Manager, Gas Works, Ripon.
" 18	Ripon—Re-tubing Condensers	—	Clerk to Committee, 6 Waterloo Place, S.W.
" 23	Epsom—Hot-water Plant, &c.	—	—

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IN

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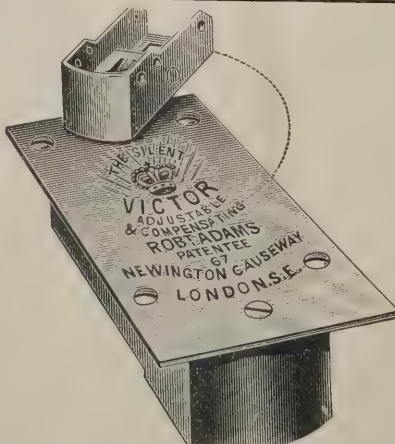
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THE ARCHITECTURAL AND BUILDING EVENTS OF 1904.

IN compiling an illustrated summary of the year's events such as we now give a number of difficulties have to be met in regard to the numerous buildings erected in various parts of the country: and when actually bringing these together for review one finds a choice of two methods of treatment, either to deal consecutively with the different towns and cities throughout the Kingdom, recording the chief work in each, or to group the several buildings into classes and compare one with another. Neither of these two methods of treatment is without disadvantages, but the latter is perhaps the more useful, and we have therefore adopted it in the present record.

It matters not a great deal in what order the various classes of buildings are treated, but we begin with hospitals.

The foundation-stone of the Bart's new building was laid by the King on July 6th, Mr. E. B. T'Anson being the architect. Considerable discussion arose as to the rebuilding of the hospital on the present site, extended by the addition of $1\frac{1}{2}$ acres from Christ's Hospital, but eventually it was decided that this should be done.

In October the sum of £468,353 was voted by the London County Council for the completion of the Long Grove Asylum, Epsom, and the tender of Messrs. Foster & Dicksee, of Rugby, amounting to £359,892, for the

erection of the superstructure was accepted.

Three new hospitals in Glasgow were opened in September, namely, a large general hospital at Stobhill, to the north-east of Springburn Park (Messrs. Thomson & Sandilands, architects), a district hospital in Duke Street (Mr. A. Hessel Tiltman, architect), a district hospital at Oakbank (Mr. Alex. Culen, architect), and a nurses' home at Woodilee Asylum, Lenzie (Messrs. Salmon Son & Gillespie,

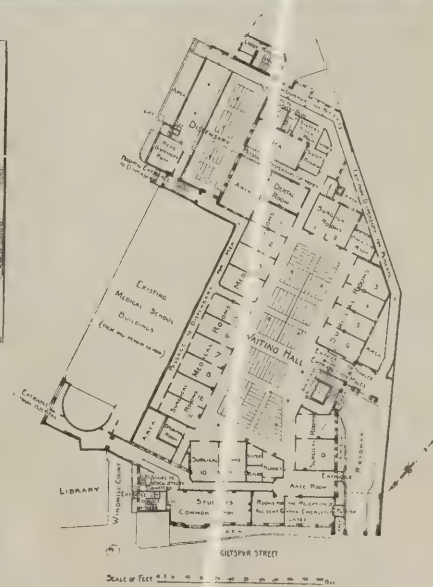


Children's Convalescent Home, St. Anne's-on-Sea. Thomas Muirhead, Architect.

architects). The primary idea is to dissociate ordinary poor-house cases from those requiring active hospital treatment. The buildings at Stobhill provide accommodation for 1,650 patients, 100 nurses and 70 servants (cost £300,000); the eastern district hospital in Duke Street, 244 patients (cost £75,000); the western district hospital at Oakbank, 207 patients (cost £71,500), and the nurses' home at Woodilee, £17,398.

The rebuilding of St. George's Hospital on its present site facing Hyde Park Corner was placed in the hands of Mr. H. Percy Adams, who prepared plans in November. The scheme is estimated to cost £300,000.

Under Mr. Adams's direction also the additions to the General Hospital, Tunbridge Wells, were completed. The children's ward decorated with tile wall-pictures is one of the features of this hospital.



New Outpatients' Department, St. Bartholomew's Hospital, London. E. B. T'Anson, Architect.

The Crewkerne Hospital, erected to the memory of Queen Victoria, was opened in October by Sir Frederick Treves. The cost of the building was £53,000. Mr. Edwin T. Hall was the architect.

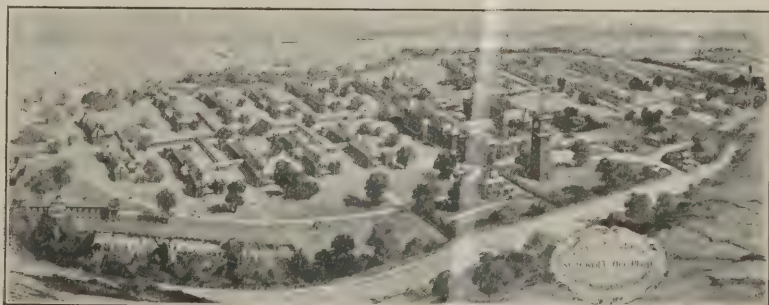
A new dispensary at Chelsea was erected from designs by Messrs. Sheppard & Burkinshaw. It replaces the old building in Sloane Square and has cost £3,000.



Main Entrance.



Recreation and Dining Rooms, Seacroft.



Seacroft Hospital, Leeds. Edwin T. Hall, Architect.



Selected Design for London Lying-in Hospital. H. H. and M. E. Collins, Architects.



Children's Ward, Tunbridge Wells General Hospital. H. Percy Adams, Architect.

The removal of King's College Hospital to a site at Camberwell was decided on, five architects being invited to submit designs.

A new form of ward—Y-shaped—was shown in the design for the Royal Infirmary at Manchester submitted by Messrs. Henman & Cooper, who claim for it all the good points of a circular ward (provided the internal angles are well rounded off) without its acknowledged defects. "Thus, it is capable of being adjusted to the varying number of

Four new wards at the London Hospital were erected on the top floor of the west wing, from designs by Messrs. Rowland Plumbe & Harvey, at a cost of £20,000. They accommodate twenty-seven men and twenty-seven women. A large kitchen for the purposes of the Hebrew dietary is placed centrally between the wards.

Two large hospitals at Leeds, built at a total cost of £361,000 at Seacroft and Killingbeck by the Corporation, were formally opened at the end of September. Mr. Edwin T. Hall, F.R.I.B.A., was the architect. The hospital at Seacroft is for the treatment of ordinary infectious cases, while that at Killingbeck is for small-pox patients.

The important competition for the rebuilding of the Royal Infirmary at Manchester was decided in March, the selected architects being Messrs. Edwin T. Hall and John Brooke. The scheme is estimated to cost £324,000.

At the King Edward VII. Sanatorium at Midhurst, Sussex (Mr. H. Percy Adams, F.R.I.B.A., architect), building work proceeded so far that by the end of the year the roofs were on the main buildings and work well forward with the unique chapel,

which is Y-shaped on plan, one arm being intended for women and the other for men; the chapel is entirely open on the south side, and in fine weather it is anticipated that services will be held out of doors.

Considerable attention was given to the proposed mosque for London, designed by Mr. Robert Williams, F.R.I.B.A., who received definite instructions, including approximate dimensions, from an Egyptian pasha to prepare sketch designs to be submitted to the Sultan.



New Roof, Magdalen College Hall, Oxford. G. F. Bodley, Architect.

At Newcastle-on-Tyne work progressed with the very extensive new infirmary on the Leazes (Mr. H. Percy Adams and Mr. W. Lister Newcombe, architects). The fabric of the main blocks has been erected, the nurses' home completed, and several of the pavilions are partly finished.

In May Mr. John P. Seddon and Mr. E. B. Lamb exhibited their drawings of a proposed Imperial Monuments Hall to be erected adjoining Westminster Abbey.



Proposed Mosque for London. Robert Williams, Architect.

The Frimley Sanatorium for Consumption on the Chobham Ridges, near Bagshot, was opened by the Prince of Wales on June 25th. The plan consists of four wings radiating from the corners of a three-storey block in the centre. The wings are two storeys high. The cost of land and buildings amounted to £70,000. Mr. Edwin T. Hall was the architect.

Kelling Sanatorium, Norfolk, was completed, Messrs. Clare & Ross being the architects. The cost, including drainage and water-supply, was £1,300, or £59 per bed.



Proposed Imperial Monuments Hall, Westminster. John P. Seddon and E. B. Lamb, Architects.



Selected Design for Manchester Royal Infirmary. Edwin T. Hall and John Brooke, Architects.



Nurses' Home, Charing Cross Hospital, Chandos Street, London. A. Saxon Snell, Architect.



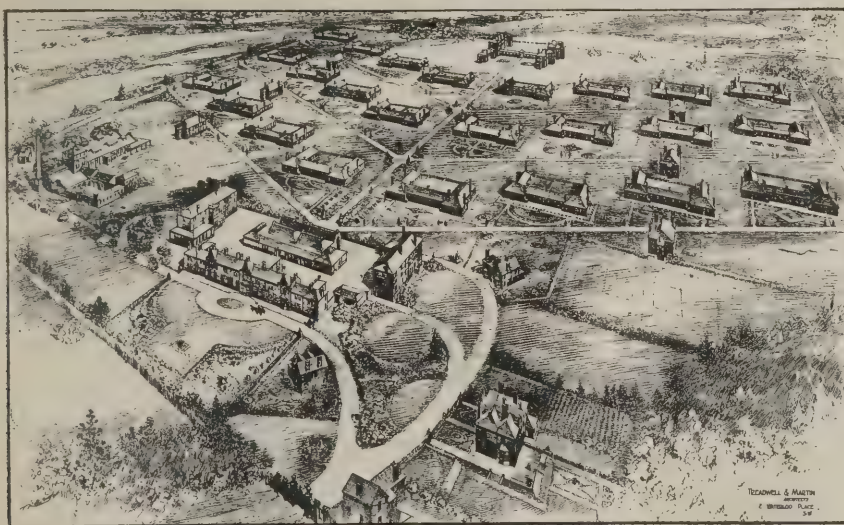
Chelsea Public Dispensary. Sheppard and Burkinshaw, Architects.



Nurses' Home, Woodilee Asylum, N.B. Salmon & Son & Gillespie, Architects.



Woodhouse, Whitloughby and Langham, Joint Architects.



Southern Hospital, Carshalton. Treadwell and Martin, Architects.



Exmouth Cottage Hospital. Tait and Harvey, Architects.



Frimley Sanatorium: View from S.S.W. Edwin T. Hall, Architect.



New Hebrew Ward, London Hospital. Rowland Plunbe and Harvey, Architects.



St. Anne's Cathedral, Leeds. J. H. Eastwood, Architect.



Belfast Cathedral. Sir Thomas Drew, Architect.

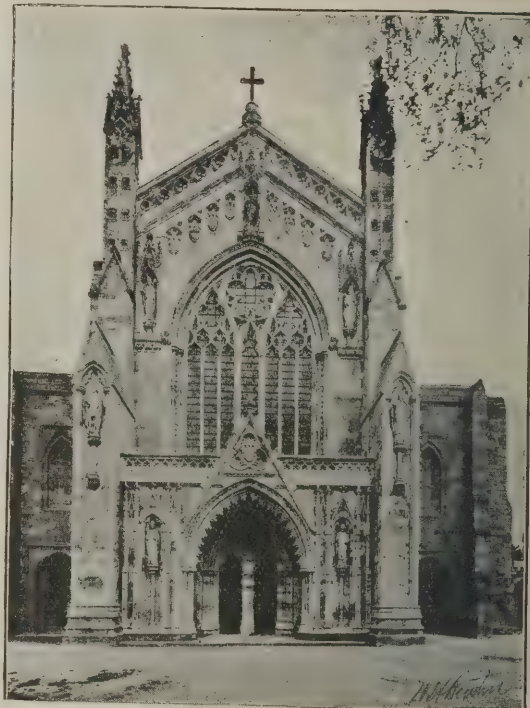


Photo: Bustyn, Hereford.

New West Front, Hereford Cathedral. J. Oldrid Scott, Architect.



Armagh Cathedral. C. J. MacCarthy, Architect.

The new Roman Catholic Cathedral of St. Anne at Leeds (Mr. J. H. Eastwood, architect) was completed in May. Owing to the awkward site a wide nave was essential, but by the construction of double side-aisles, the carrying up of the nave piers and arches as high as possible, and by ingenuity in other respects, the architect has effectually counteracted the mathematical equality of the four sides of the site. The nave, aisles, transept and Lady Chapel will seat 850 persons, and the choir, exclusive of canons' stalls, 50.



At Manchester Cathedral a new building was erected, accommodating the library and providing vestries for the clergy and a sacristy, while inside the cathedral the Jesus Chapel or chantry was restored by the removal of the book-cases and

screens which for forty years or more obstructed the view. This work was carried out by Mr. Basil Champneys, F.R.I.B.A.

The new Cathedral: west front to Hereford Cathedral was dedicated on March 25th, after restoration from Mr. Oldrid Scott's design. The upper part of the old front had been rendered insecure by the earthquake of 1896, while the whole façade as rebuilt by Wyatt in 1786 was considered unworthy of the rest of the cathedral. An entirely new west portal, with rich double doorways into the cathedral, has been erected, and the remainder of the walling and the projection of the two heavy buttresses, between which the portal has been placed, have been replaced. The renewal of the west front of the side aisles, with the addition of massive turrets, will eventually be undertaken.

New West Window at Exeter Cathedral.

At Exeter Cathedral the old west window by Peckitt was replaced by a new one designed by Mr. Bodley and executed by Messrs. Burlison & Gylls. The old tracery was very much decayed.

Belfast and Armagh Cathedrals.

The first section of the new protestant cathedral of Belfast was consecrated in June. The total cost will be £100,000. The Roman Catholic Cathedral at Armagh was consecrated in July. The building is cruciform on plan, comprising nave, aisles and transepts, with chancel and choir.



Rochester Cathedral with the New Tower.



Rochester Cathedral with the Old Tower.



Presbyterian Church, Blundellsands.
Arnold Thornely and Gilbert Fraser, Architects.

Liverpool
Cathedral.

The excavation of the site of Liverpool Cathedral was begun and the foundation-stone laid by the King on July 19th. The committee have about £200,000 in hand, though the portion of the building undertaken is estimated to cost £240,000. This first portion will accommodate a congregation of 3,500 but is not expected to be ready for six or seven years.



Truro Cathedral: West Front.

The Bell Harry
Tower.

A scaffolding was erected around the Bell Harry Tower of Canterbury Cathedral, which was found to be much decayed outside, mullions and pinnacles being dangerously unstable. The roofs of the south transept and of the western portion of the north aisle; and other portions of the fabric, were also found to be urgently in need of

repair. The cost of the necessary repairs to the central tower is estimated at £10,500, and for the rest £3,460.

Rochester.

The tower of Rochester Cathedral was rebuilt at a cost of £5,000 from designs by Mr. C. Hodgson Fowler. The old square tower was erected in 1825 by a Gothic architect named Lewis Cottingham, and was of Bath stone; it was in a very bad state of repair. The new tower is of Weldon stone and reproduces the original one built about 1319 by Bishop Hamo. It has a spire of milled lead.

Truro.

At Truro the central tower and spire, built at a cost of £15,000, were dedicated in January. The new cathedral was designed by the late Mr. J. L. Pearson.

Chichester.

At Chichester Cathedral the old reredos was pulled down and removed to St. Saviour's Church, Brighton, the repair of the bell tower was undertaken, and the old Arundel screen set up on the ground floor of the tower.

York.

At York Minster the restoration work on the west front progressed slowly, though satisfactorily, under the superintendence of Mr. Bodley. The fabric was found to be in a very faulty condition owing to the inefficient manner in which the repairs were carried out at the beginning of the last century.

Bath Abbey.

In August the south-east pinnacle of the central tower of Bath Abbey was struck by lightning, the south-east pinnacle being damaged. The work of restoration, which is somewhat extensive, is now being proceeded with under the direction of Mr. T. G. Jackson.



Wesleyan Church and Schools, Long Eaton.
Brewill and Baily, Architects.

St. Paul's.

At St. Paul's Cathedral the western aisle of the south transept was converted into the baptistery, and the restoration of the colonnade below the dome was taken in hand.



Chancel, Truro Cathedral. John L. Pearson, Architect.

Peterborough.

At Peterborough Cathedral the clearstory window on the north side of the choir, which was sinking and falling away, was reset and strengthened with bonders, and the large octagonal turrets with spires on either side of the apse were pointed and repaired. Further work, however, had to be stopped for want of funds.

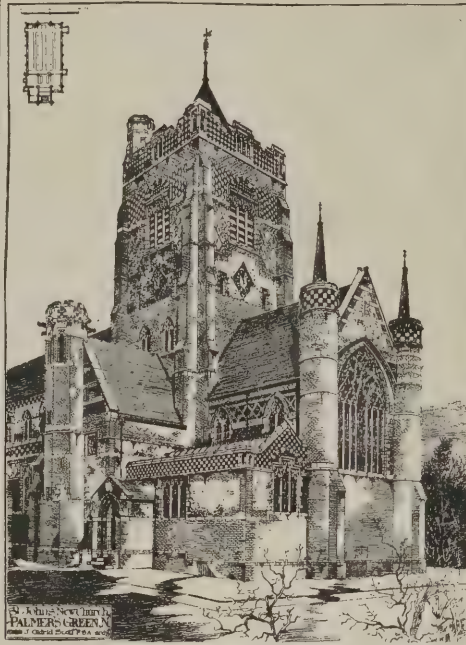


Church of Christ, Scientist, Victoria Park, Manchester.
Edgar Wood, Architect.





H. P. Burke Downing, Architect.



For the repair of the north and south transepts at Peterborough £1,200 is still needed. In November a Flamboyant traceried window was discovered in the passage leading from the cloisters to what was once the monastic kitchens.

The roof of the south aisle of Winchester Cathedral was repaired by removing, re-casting and re-laying the lead.

A memorial church to Hugh Latimer was erected in Handsworth New Road, Birmingham, at a cost of £15,000, from designs by Mr. Bidlake. It is of Staffordshire bricks with Grinshill stone dressings, lined inside with buff bricks, with a stone arcade in the nave. Accommodation is provided for 1,000 persons.

Christ Church, Port Sunlight, was opened on June 1st. It cost £28,000. Messrs. William & Segar Owen were the architects.

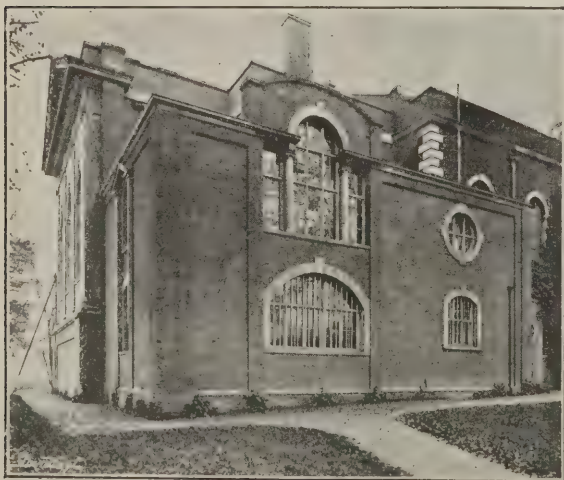
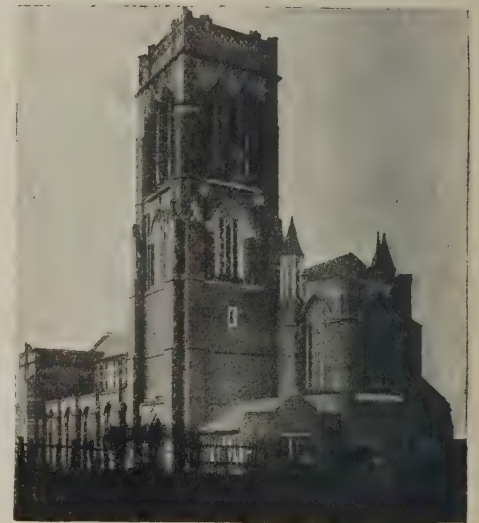
The parish church of Portsmouth was re-opened in November after repair and renovation under the direction of Mr. T. G. Jackson.

Towards the end of the year the demolition of St. Philip's Church, Regent Street, London, was begun, no one regretting the effacement of this dull copy of Greek and Roman models.

At Long Eaton the new Wesleyan church (Messrs. Brewill & Baily, architects) was erected.

A new tower to Cowley Church, Oxford, was erected.

At Burtonwood, near Collins Green, Lancs, the parish hall was erected, Messrs. Deacon & Horsburgh being the architects, and Messrs. R. Wearing & Son the contractors, the carpenter's and joiner's work having been executed by Messrs. Duthie & Dobson—all of Liverpool.

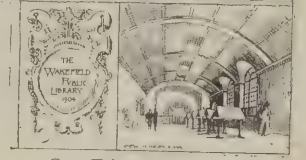
Parish Hall, Burtonwood, Collins Green, Lancs.
Deacon and Horsburgh, Architects.New Chancel, Clapham Parish Church, London.
Beresford Pite, Architect.Latimer Memorial Church, Birmingham.
W. H. Bidlake, Architect.

At Clapham Parish Church a new chancel, side chapel and vestries in two storeys were erected from designs by Prof. Beresford Pite. The character of the design was largely governed by the quite simple lines of the older portion.

St. Andrew's Church, Linacre, Liverpool.
Willink and Thicknesse, Architects.



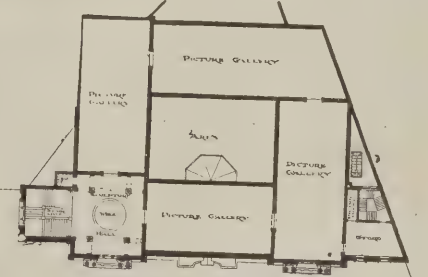
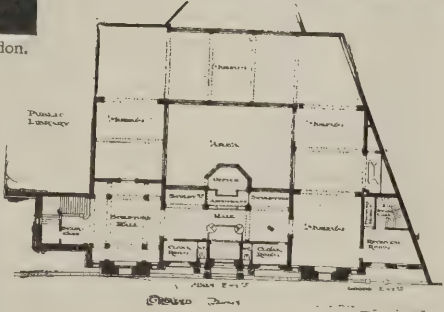
Goddard, Paget & Catlow, Architects.



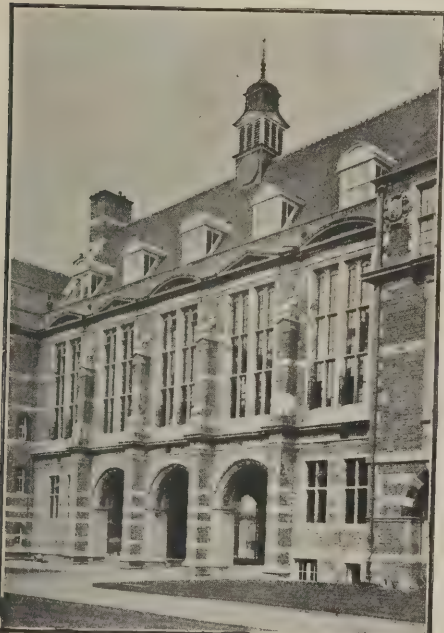
Cox, Trimmell & Davison, Architects.



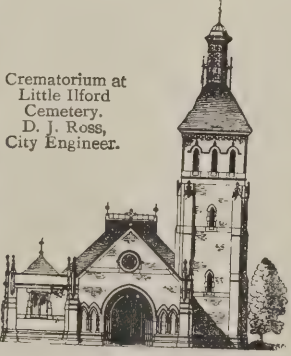
Law Society's New Hall and Library, Chancery Lane, London.
H. Percy Adams, Architect.



Laing Art Gallery, Newcastle-on-Tyne. Cackett & Burns-Dick, Architects.



The Law Library, Cambridge. T. G. Jackson, Architect.



Crematorium at Little Ilford Cemetery.
D. J. Ross, City Engineer.



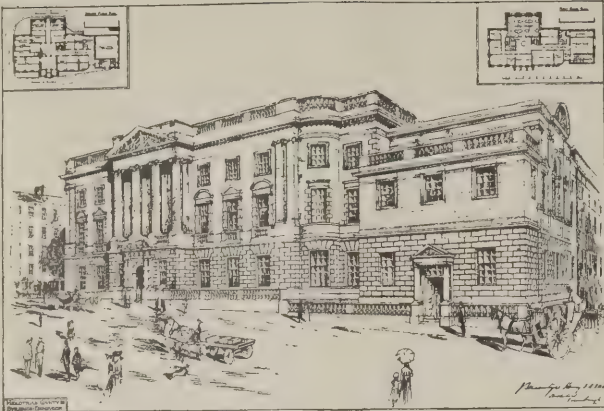
Selected Design for Free Library, Public Offices, &c., Ilkley.
W. Bakewell, Architect.



Sedgwick Memorial Museum, Cambridge. T. G. Jackson, Architect.



Central Library, Hammersmith. Henry T. Hare, Architect.



Midlothian County Buildings, Edinburgh. J. Macintyre Henry, Architect.



Bradford Town Hall Extension.
R. Norman Shaw and F. E. P. Edwards, Architects.



Selected Design for Stockport Town Hall. A. Brumwell Thomas, Architect.

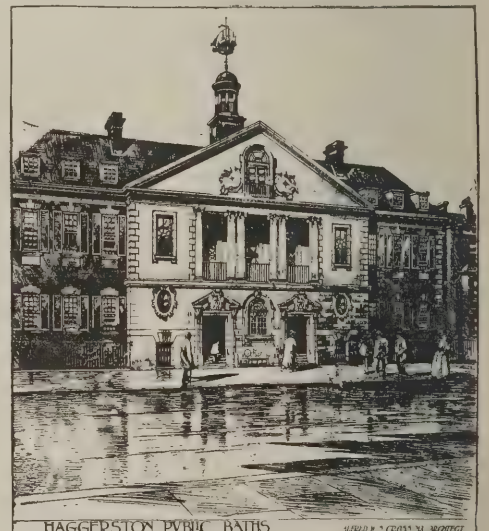


Selected Design for Public Library and Municipal Buildings, Rawtenstall, Manchester. Crouch and Butler and R. Savage, Architects.



District Council Offices, Pontypridd. Henry T. Hare, Architect.

SOME MUNICIPAL BUILDINGS.



Selected Design for Council House and Free Library, Erdington, Birmingham. John P. Osborne, Architect.



County Hall, Northallerton. Walter H. Brierley, Architect.



Selected Design for Sunderland Municipal Buildings Extension.
Wills and Anderson, Architects.



Aeolian Hall, Bond Street, London. Walter Cave, Architect.

Baths, Town Halls, &c.

The new baths and wash-houses at Haggerston were opened on June 25th.

The new public baths in the Old Kent Road were completed towards the end of the year from the designs of Mr. E. Harding Payne, A.R.I.B.A. The total cost of the buildings will be £55,000. They comprise two swimming baths, slipper baths, and Turkish and Russian baths. Water is obtained from an artesian well at a depth of 400ft.

Considerable progress was made with the erection of the Cardiff Town Hall and Law Courts (Messrs. Lanchester, Stewart & Rickards, architects); also with the new asylum at Whitchurch (Messrs. Oatley & Skinner, architects).

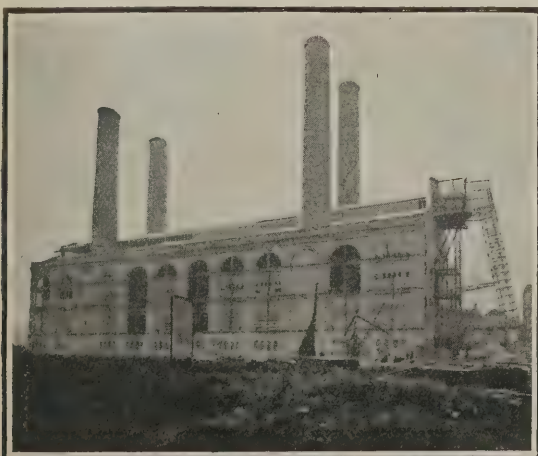
The new town hall at Hereford was opened on June 2nd. It cost £25,000. Mr. H. A. Cheers was the architect, his design having been selected in competition.

A new town hall was commenced at Leigh. It will cost £40,000, inclusive of £10,000 for the site. Mr. J. C. Prestwich is the architect. It is expected to be opened in two years' time.

The foundation-stone of the new town hall at Stockport (Mr. A. Brumwell Thomas, architect) was laid, and building operations commenced.

Bradford Town Hall Extensions.

Extensions to Bradford Town Hall were decided to be carried out from designs by Mr. F. E. P. Edwards, A.R.I.B.A., the city architect, at a cost of £70,000. A new building is to be erected where the Conditioning House formerly stood, and structural alterations are to be made to the present hall, the old and new buildings being connected by a spacious corridor.



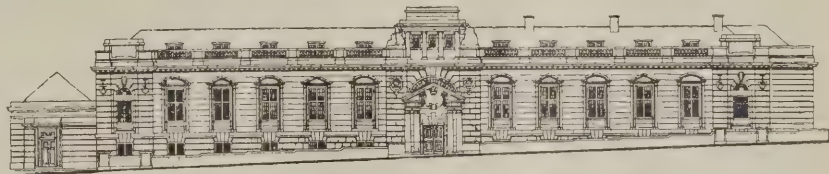
"Underground" Electricity Generating Station, Lot's Road, Chelsea.

New county buildings at Edinburgh.

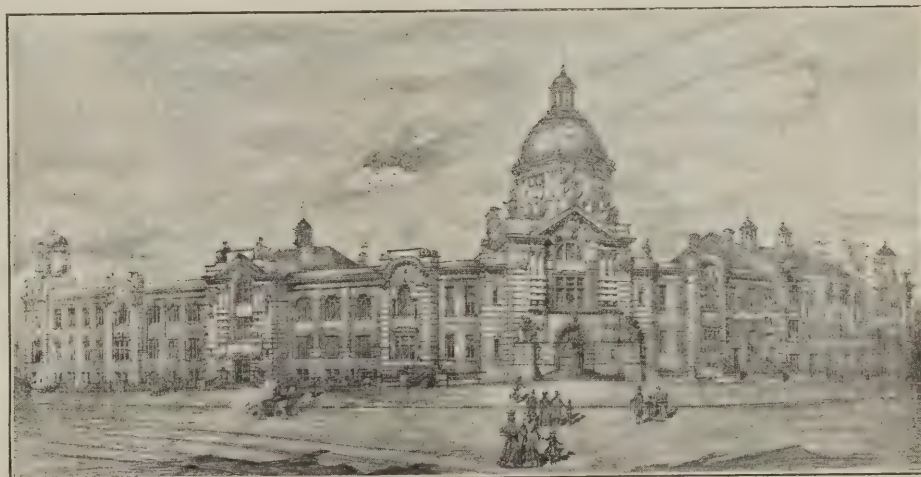
Edinburgh were completed at a cost of £40,000 on the old site lying between Parliament Square and George IV. Bridge, the architect being Mr. James Macintyre Henry, F.R.I.B.A., of Edinburgh. The sculptor-work was designed and executed by Mr. W. Birnie Rhind, A.R.S.A.

In Old Bailey the building of the new sessions house from designs by Mr. E. W. Mountford, F.R.I.B.A., made good progress. By December the work was up to the second storey. An ingenious arrangement was adopted by Messrs. Holloway Brothers, the contractors, for handling the stone blocks on the walls, a joist being arranged along the frontages and a traveller fitted on it with a hook to catch the lewis of the blocks, the joist being raised as each storey was completed.

A new County Quarter Sessions House at Preston, designed by Mr. Littler, was opened in June. The cost was £65,000.



Selected Design for Torquay Library and Municipal Offices T. Davison, Architect.



Selected Design for Acton Town Hall. William G. Hunt, Architect.

Law Society's Hall.

On March 23rd the King and Queen opened the new hall of the Law Society in Chancery Lane. This forms a new wing to the old premises, and is a delightful piece of design by Mr. H. Percy Adams, F.R.I.B.A. The hall is on the first floor, and is 88ft. long by 40ft. wide by 23ft. high, panelled in mahogany, with a bold Della Robbia frieze above, and some magnificent Cipollino columns having bronze capitals. In effect the hall is rich and harmonious.

Libraries, &c.

The new public library, art, science and technical school at Eastbourne (Mr. Philip A. Robson, A.R.I.B.A., architect) was opened in August.

The new Carnegie Library at Stratford-upon-Avon, designed by

Mr. E. G. Holtom, was completed at the beginning of November. It harmonizes with its surroundings. The Hornby cottages were preserved and the "China Shop" restored.

At Hammersmith the new central library, facing Brook Green Road, was brought well on to completion. The lending library is 55ft. by 44ft. and is arranged for 31,000 volumes, and the reference library for 20,000 volumes.

A new museum and art gallery at Kingston-on-Thames (Mr. Alfred Cox, A.R.I.B.A. architect) was opened by Lord Rosebery in October.

The Laing Art Gallery at Newcastle - on - Tyne was opened in October.

It is a two-storey building with a large entrance in Higham Place admitting to the sculpture hall and three lofty galleries extending behind the library. The upper floor consists entirely of top-lighted galleries, each 65ft. by 27ft. by 27ft. high. Messrs. Cackett & Burns Dick were the architects.

Messrs. C. Weeks & Son, estate agents and furniture warehousemen, erected a five-storey building in White Ladies' Road, Bristol; Mr. H. Dare Bryan, F.R.I.B.A., being the architect, and Messrs. R. Wilkins & Son the contractors.

Under Kingsway—the new thoroughfare from the Strand to Holborn—the construction of the tramway tunnel and subways for pipes and wires was undertaken.

The work is of a very substantial nature and will avoid the intolerable nuisance of tearing up the roadway, as so commonly done. The tunnel starts from a spot close to the new



Kingsway Subway.

Gaiety block and will emerge in Southampton Row to join up with the Theobald's Road trams; and eventually it is intended to extend it to the Embankment, to link up with the tramways which it is proposed to construct there and across Westminster and Blackfriars Bridges.

The Ancient
Lights Case.

In May the important ancient lights case of *Colls v. Home and Colonial Stores* was decided. For the public spirit he displayed in taking this case to the House of Lords, Mr. Colls was presented by the Institute of Builders with a silver bowl, and received the hearty thanks of the R.I.B.A., the Society of Architects and other bodies. The precise questions in the

case were whether after twenty years the owner was entitled to all the light he enjoyed at the beginning and whether mere diminution of light gave a right to an injunction or to damages. The judgment which has now been given by the House of Lords virtually affirms that a person



J. Howard Colls.

is entitled to only so much light as is reasonable and necessary; the test of obstruction being whether the building complained of is a real nuisance, which must be decided on the merits of each case.

In July the Tariff Commission issued its first volume, containing a mass of information and figures in regard to the iron and steel trades, from which it was again seen how the importation of girders, beams and other constructional ironwork from Belgium, Holland and other parts of the Continent had increased during the last ten years.

Tariff Commission.

M. Choisy.

The Royal Gold Medal was presented to M. Auguste Choisy in February for his literary contributions to architecture. M. Choisy is the distinguished French author of "L'Art de Batir chez les Romains" and the succeeding books dealing with the Byzantines and the Egyptians, as well as a great history of architecture (to which he devoted more than twenty years)—all the result of most careful study and presenting quite new accounts of how the ancient buildings were erected.

M. Auguste Choisy,
Royal Gold Medallist, 1904.

Schools.

The St. Paul's School for Girls at Brook Green, Hammersmith (Mr. Gerald C. Horsley, architect), was opened in April by the Princess of Wales. Accommodation has been provided for 400 girls at a cost of £60,000. The interior design of the school—particularly the entrance corridor and the central hall—is very refined and imposing.

New board schools at York, in Haxby Road, accommodating 1,200 pupils, were completed from Mr. Walter H. Brierley's designs.

New buildings for the medical school and physics laboratory were erected at Liverpool University at a cost of £56,000, the former from designs by Messrs. Waterhouse & Son and the latter from designs by Messrs. Willink & Thicknesse and Prof. F. M. Simpson, joint architects.

A new master's house and dormitories at Radley College, Abingdon, was erected from designs by Mr. Arthur H. Ryan-Tenison, F.R.I.B.A.

A new school of decorative painting was opened in Manchester at the beginning of the year. It has been formed under the auspices of the National Association of Master House-Painters and Decorators of England and Wales with a view to meeting the needs of young men desirous of perfecting their training in decorative painting.

New schools at Wyke, Bradford, were built from designs by Messrs. Adkin & Hill, architects, of Bradford. They comprise three blocks, the largest of which provides for 386 girls and boys. A second block accommodates 230 infants, and a third consists of workshops, swimming bath, gymnasium, &c.; while a fourth block (or, rather, an extension of the first) is in course of erection for a boys' department with the same accommodation as the present mixed school. The total cost of the scheme will be about £21,000.

New schools were begun at Bournville, near Birmingham, from designs by Mr. W. Alex. Harvey, the expense (estimated at £20,000) being borne by Mr. and Mrs. George Cadbury.

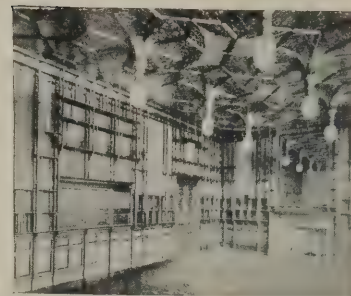
The Blue Coat School at Liverpool was brought on to completion, the roofs being on by the end of the year and the chapel half finished, though no sign of the tower was visible.

Considerable outcry was raised in Dublin by the proposal to erect a technical institute on the east side of Rutland Square, but eventually the proposal was defeated and this fine old square preserved from the introduction of a disquieting modern building.

The foundation stone of the Nautical School, Portishead.

School at Portishead which is to supersede the old training ship H.M.S. "Formidable," was laid on July 14th.

The school will be three storeys high, with a frontage of 382ft. The dormitory floors are to be made to resemble the deck of a ship, the lads sleeping in hammocks. The cost will be £30,000 and the school will accommodate 350 to 400 boys. It is illustrated on p. 11 of this supplement.



Whistler's Peacock Room.

This room was designed by the late James McNeill Whistler for the late Frederick

Richard Leyland, the famous fine arts patron and collector, to shelve his oriental china. Whistler did the actual painting, helped by an assistant who presumably did the gilding of the flat spaces and lacquering of the woodwork. The room was purchased by Messrs. Obach & Co., and removed in its entirety to their galleries at 168, New Bond Street, W.

The Botanical School, Cambridge, is an oblong block 200ft. by 40ft. It contains an herbarium, museum, a large lecture room, library, and laboratories and rooms.

The Law Library and Law School, Cambridge, has the library on the first floor, with porter's residence and committee and book-packing rooms below.

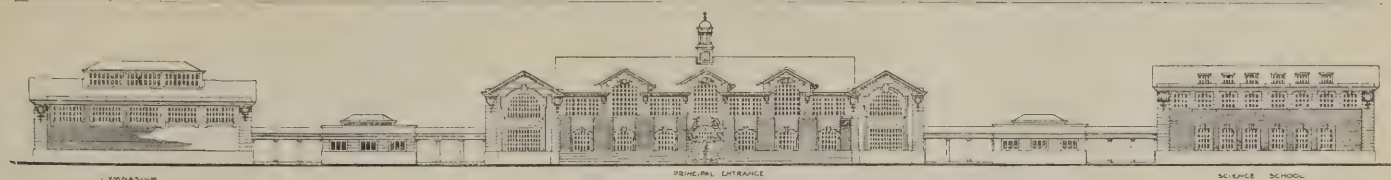
The Sedgwick Memorial Museum was opened by the King and Queen on March 1st. The Great Museum is on the first floor (300ft. long) and museums and laboratories on the second floor.

The Leysian Mission Building in City Road, London, cost £112,000. The Queen Victoria Hall seats 2,000 persons. In addition there are a small hall and numerous Sunday-school classrooms, clubrooms, refreshment-rooms, a drill-hall and gymnasium, and rooms for administrators, &c.

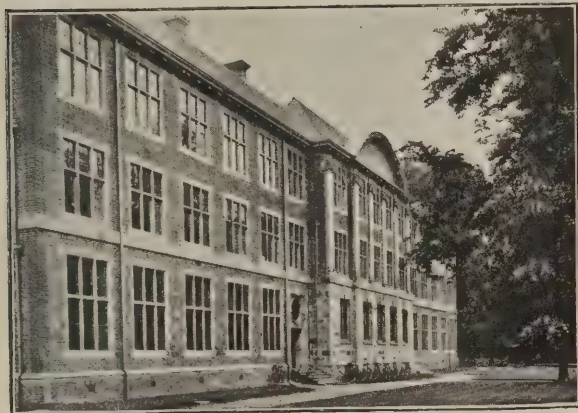
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Leysian Mission Building, City Road, London.
Bradshaw and Gass, Architects.

Colman Institute, Redhill. Hubert Gilford, Architect.



Selected Design for Royal Grammar Schools, Newcastle-on-Tyne. Russell and Cooper, Architects.



The Botanical School, Cambridge. W. C. Marshall, Architect.



Royal College of Science, South Kensington. Sir Aston Webb, Architect.



Schools at Wyke, Bradford. Adkin and Hill, Architects.



Elementary Day Schools at Bournville, Birmingham. W. Alex. Harvey, Architect.



Nautical School, Portishead. Edward Gabriel, Architect.



St. Paul's School for Girls, Hammersmith: Central Hall. Gerald C. Horsley, Architect.



Humphry Museum and Medical Schools, Cambridge. Edward S. Prior, Architect.





Tite Prize Design for a Crescent in a Large City. Heaton Comyn, Architect.



Design for a Crescent in a large City: Medal of Merit. Arthur D. Nicholson, Architect.

R.I.B.A. Prize Drawings.

The drawings submitted for the studentships and prizes of the Royal Institute of British Architects this year did not include any design of surpassing merit, but there were many which were very praiseworthy. The fourteen designs submitted for the Soane Medallion, taken as a whole, were poor, though the winning design by Mr. Frederic Horth, of Hull, and Mr. David Smith's (awarded a certificate of hon. mention) were of considerable merit. The eleven Tite designs were more interesting, Mr. Heaton Comyn's prize design being excellent, as also that by Mr. Arthur D. Nicholson, awarded a medal of merit. The Grissell was won by Mr. J. W. Hepburn, the Pugin by Mr. Mears and the Owen Jones by Mr. Davidson.

lition at Ramsgate was erected for the Corporation at a cost of £40,000. The great hall seats 2,000 persons.

Bradford Exhibition.

The Cartwright Memorial Hall at Bradford was opened in April. It was erected to the memory of Dr. Cartwright, inventor of the power loom and other machinery in connection with the textile industry, and formed the permanent building at the Bradford Exhibition. Messrs. J. W. Simpson and E. J. Milner Allen were the architects. An industrial hall and concert hall were erected from the joint designs of Mr. James Ledingham, F.R.I.B.A., and Mr. F. E. P. Edwards, A.R.I.B.A., city architect of Bradford.

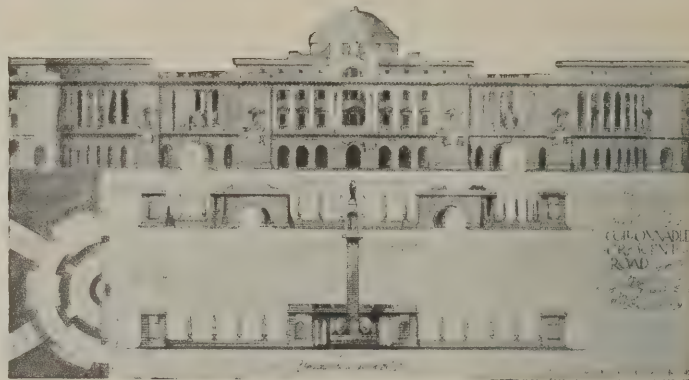
New University Buildings.

Extensive additions to the accommodation for undergraduates at Merton College, Oxford, were erected from designs by Mr. Basil Champneys.

The hall of University College, Oxford, was lengthened and the plaster ceiling which covered up the fine old oak roof removed; Mr. H. W. Moore being the architect.

The old panelling and Elizabethan screen in the hall of Exeter College, Oxford, was restored and the stone chimney-pieces replaced by two in oak and Hopton Wood stone, executed by Mr. Aumonier; Mr. Reginald Blomfield being the architect.

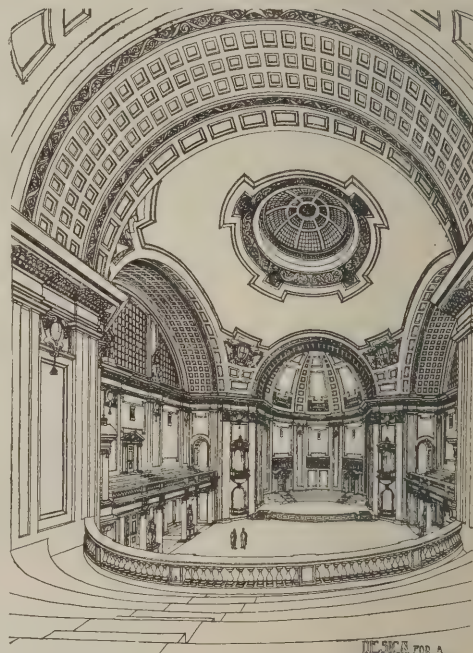
Considerable advance was made at the Birmingham University Buildings (Sir Aston Webb & E. Ingress Bell, architects). There are at present being erected four out of the proposed ten T-shaped blocks. The centre block, called the "Great Hall," will be one of the finest and largest buildings in the district, its dimensions being 150ft. long by 75ft. wide. To the right are two blocks for engineering laboratories, and to the left a block for mining and metallurgy.



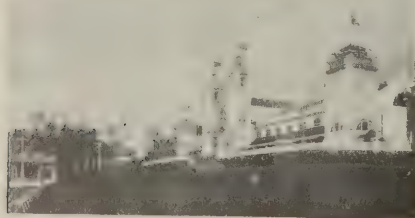
Frederick R. Hiorns, Architect.

The Queen Victoria Memorial at Liverpool was proceeded with (Messrs. Willink & Thicknesse, and Prof. F. M. Simpson, architects; Mr. C. J. Allen, sculptor). It promises to be a very fine piece of work.

The Victoria Pavilion



Soane Medallion D sign. Frederic J. Hord, Architect.



Industrial Hall, Bradford Exhibition.



Cartwright Memorial Hall, Bradford. J. W. Simpson and E. J. Milner Allen, Architects.



Victoria Pavilion, Ramsgate S. D. Adshead, Architect.



Liverpool Queen Victoria Memorial.

Academy. At the Royal Academy Exhibition the architectural works were of good average merit, though nothing of surpassing excellence was shown. Among the chief exhibits were Mr. E. M. Gibbs's design for the extension of the Sheffield Museum and Mappin Art Gallery, Mr. Carøe's for the University of South Wales and Monmouthshire, Messrs. Baker, Masey & Sloper's for buildings at Johannesburg, Mr. Walter J. Tapper's interior of Liverpool Cathedral, Sir Aston Webb's Queen Victoria Memorial, Mr. Bodley's roof to Magdalen College, Oxford, and Mr. Flockhart's "Rosehaugh," Ross-shire; as well, of course, as much excel-

lent domestic work by Mr. Dawber, Mr. Newton and other well-known architects. The stagnant condition of the building trade in 1903 has not improved during 1904. In the large centres there have been almost as many large jobs as in former years, but the depression has been felt in the smaller property, especially in house work. The percentage of unemployed has throughout the year been greater month for month than during 1903. The depression in trade and the dearness of money have had their natural effect upon the restriction of output in the building trades.



"Park Down," Surrey. E. Guy Dawber, Architect.



Extension of the Sheffield Public Museum and Mappin Art Gallery. Edward M. Gibbs, Architect.



FROM THE ROYAL ACADEMY EXHIBITION, 1904.



Ironmongers' Hall, Fenchurch Street, London. Hubbard and Moore, Architects.



University of South Wales and Monmouthshire, Cardiff. W. D. Carøe, Architect.



House at Wimbledon. Ernest Newton, Architect.



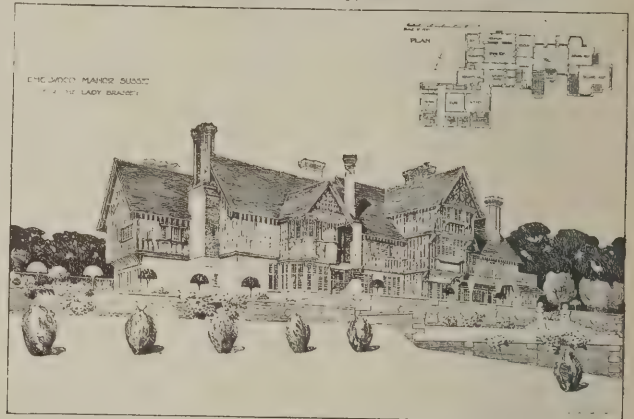
Parish Institute for an East London Suburb. Edwin Gunn, Architect.



Silcock and Reay, Architects.



House at Winterslow, near Salisbury. Alfred H. Hart and P. L. Waterhouse, Architects.



A. N. Prentice, Architect.



"Coldicote," Worcester. E. Guy Dawber, Architect.



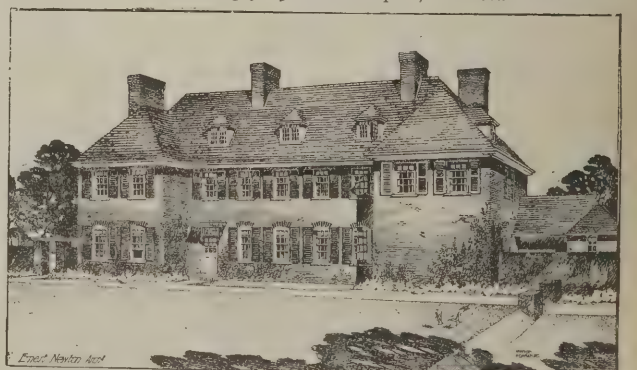
"Bibsworth," Wores E. Guy Dawber, Architect.



House at Rugby. John W. Simpson, Architect.



Court House and Police Station, Bedale. Walter H. Brierley, Architect.



House at Bickley, Kent. Ernest Newton, Architect.



Burton Hall, Cheshire. Nicholson and Corlette, Architects.



Houses on Norbury Manor Estate. Frank S. Chesterton, Architect.



Branches Park, Newmarket. George Hornblower, Architect.



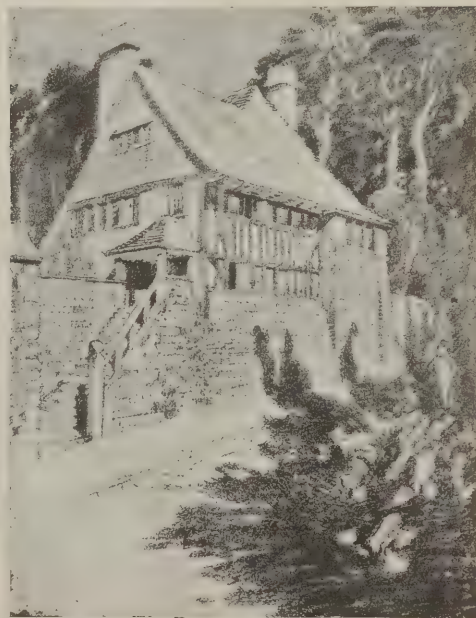
Proposed House at Hampstead. C. F. A. Voysey, Architect.



No. 75, Cheyne Walk, Chelsea. C. R. Ashbee, Architect.



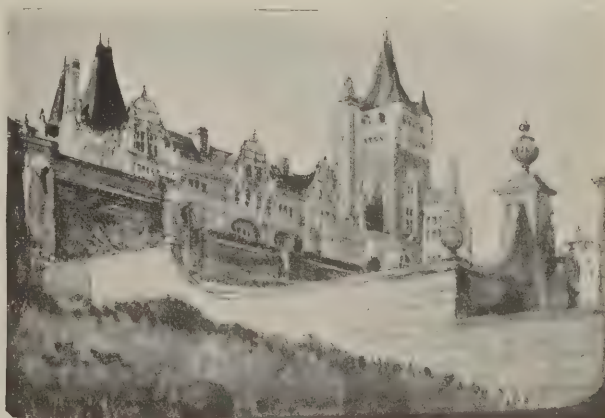
New Offices for the N.E. Rly. Co., Cowley Street, Westminster. Horace Field, Architect.



Lodge at Pembury, Kent. C. E. Mallows and Grocock, Architects



Sitting-room, No. 75, Cheyne Walk, Chelsea. C. R. Ashbee, Architect.

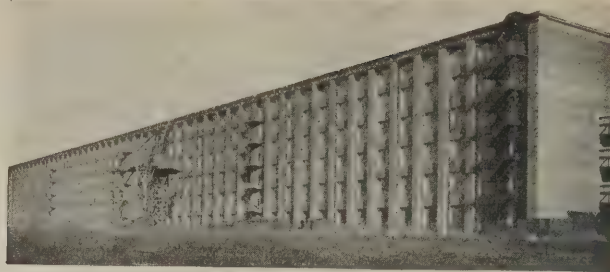


"Rosehaugh," Ross-shire. William Flockhart, Architect.



March 11th.

The Erection of Singer's Cabinet Works at Kilbowie. Robert McAlpine and Sons, Contractors.



September 1st.



City Square, Leeds.

Extensions to
Singer's Works.

A very large extension to Messrs. Singer's cabinet manufactory at Kilbowie was completed in six months by Messrs. Robert

McAlpine & Sons. The building is 800ft. in length, 80ft. in width, with six floors, making a height of 90ft. The foundations required 7,000 tons of concrete, the columns and flooring 4,000 tons of steel and ironwork, the fire-excluding casing of these 14,000 tons of ferro-lithic, and the flooring 1,500 tons of timber. The area of floors is $1\frac{1}{2}$ acres, and the windows together measure $8\frac{1}{2}$ acres. The great walls of the building at the base are 36ins. thick, reduced to 18ins. at the upper floors. One complete floor—a 15ft. height of brick wall, nearly 2,000ft. long—was completed each month, in addition to the internal walls, columns and flooring, 800 men being employed on the work.

Harrod's Stores.

An addition to Harrod's Stores in Brompton Road was a quickly erected building. On

April 30th the site of 11,500 sq. ft. was acquired. Within twenty-four days it was cleared, a basement dug out (necessitating the removal of 5,000 loads of earth), and an entirely new structure erected and handed over complete in every particular. Four days later—all within one month—the new annexe was thrown open to the public.

Coutts's new banking premises in the Strand were opened in August. The façade is of stone.

The erection of the new Colonial House, Liverpool, for Messrs. Elder, Dempster & Co., was well advanced, and by the end of the year the front to Water Street was to be seen in its entirety.

At the corner of Bold Street, Liverpool, a new branch for the North and South Wales Bank was erected (Messrs. Woolfall & Eccles, architects).

At Nottingham new business premises were erected for Messrs. J. Boot & Co. in Pelham Street, from designs by Mr. A. N. Bromley, F.R.I.B.A.

In the City Square, Leeds, the equestrian statue of the Black Prince (by Mr. Brock, R.A., sculptor) was erected, and the Standard Assurance buildings completed (Messrs. A. Neill & Son architects).



Business Premises, Tooley Street, London. C. Stanley Peach, Architect.

The Hotel Metropole, Southend, was completed. It contains 300 rooms and cost £300,000. Mr. J. Thompson was the architect.



Bank in Lodge Lane, Liverpool. Woolfall and Eccles, Architects.



Coutts's New Bank, Strand, London. J. Macvicar Anderson, Architect.



New Bank, Liverpool. Woolfall and Eccles, Architects.



New Building for West George Street Property Co., Glasgow. John A. Campbell, Architect.



Colonial House, Water Street, Liverpool.
Briggs and Wolstenholme, F. B. Hobbs and Arnold
Thornely, Architects.



Warehouse, Great Charles Street, Birmingham.
W. H. Bidlake, Architect.



New Buildings for Royal Insurance Co., North Street,
Brighton. Clayton and Black, Architects.



New Premises for Bell and Sons and the "Church Times," Portugal
Street, Lincoln's Inn Fields, W.C. Horace Field, Architect.

At Leicester the new Victoria Hall and Music Galleries, erected at a cost of £30,000 and devoted entirely to the promotion of music in the Midlands, was opened in October.

A crematorium at the City of London Cemetery, Little Ilford, was erected at a cost of £7,000. It was designed by Mr. Ross, the City engineer. The catafalque stands in a hall 27ft. by 24ft., leading out of which is a waiting-room 13ft. square. At the rear is the cremating chamber with two cremating furnaces, surmounted by a tower 80ft. high.

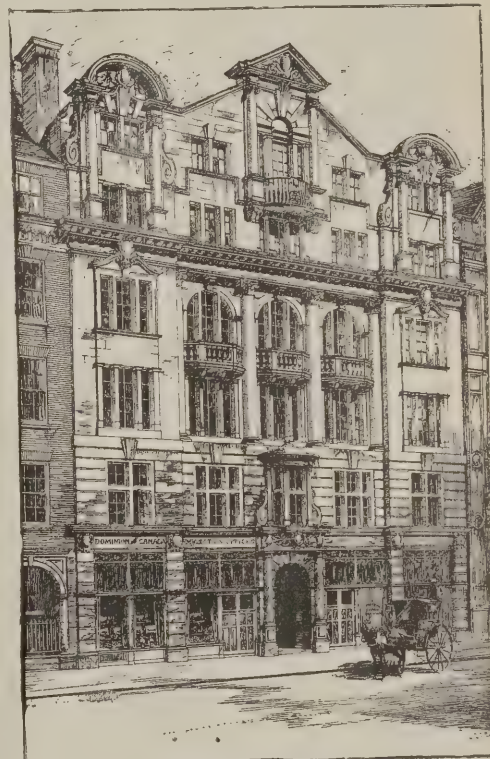
A new form of sub-contract for building work was issued by the Institute of Builders in June.

The London County Council decided to put the London Building Act Revision Bill before Parliament in the coming session.

The sixth international congress of architects was held at Madrid. The next congress will be held in London in 1906.

Municipal
Architecture.

The subject of architectural work being carried out by borough surveyors and other municipal officials received considerable attention during the year. A special committee of the R.I.B.A. was appointed to investigate the question, and as the outcome of their recommendations a memorial signed by the presidents of the Institute and of the allied societies was sent to county councils, municipal councils and district councils throughout the Kingdom—nearly 1,600



Canadian Emigration Offices, Whitehall, London.
Alfred H. Hart, Architect.

such bodies in all having been approached. The memorial urged that municipal architectural work should not be placed in the hands of engineers and surveyors.



Warehouse, Whiteladies' Road, Bristol. H. Dare Bryan, Architect.



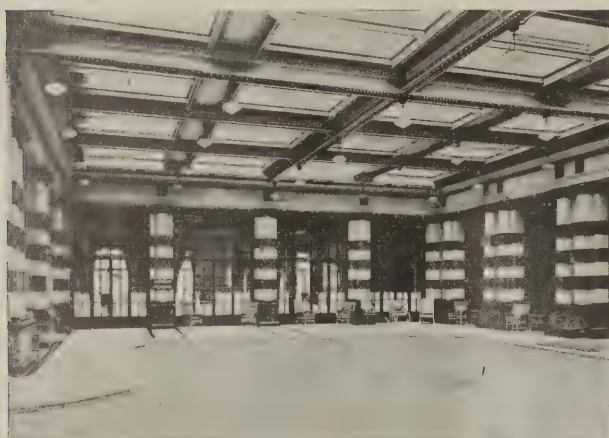
Design for Railway Station, Johannesburg.
Baker, Masey and Sloper, Architects.



Savoy Hotel Extensions.
T. E. Collcutt and Stanley Hamp, Architects.



September.



Covered Entrance Court, Savoy Hotel.

The extensions to the Savoy Hotel, London, by which an extensive frontage is secured to the Strand, were completed in remarkably quick time. The total cost of the work was nearly £1,000,000. American contractors, Messrs. James Stewart & Co., were engaged to ex-



November.
Building of the Ritz Hotel, London. Mewes & Davis, Architects



The Gaiety Hotel and Theatre.
Ernest Runtz and Ford, and R. Norman Shaw, Architects.

pedite the job. Their methods consisted in organization, diligent supervision and "push," and the workmen were paid 1d. an hour more than the union rate of wages. Steelwork was largely employed, and in consequence of the steel framework no elaborate outside independent scaffolding was needed. An outside materials hoist was a noteworthy feature. Messrs. T. E. Collcutt and Stanley Hamp were the architects.

In Stockwell Road, S.W., good progress was made with the building of the first Ingram House — a kind of hotel for clerks and others whose means are limited. There are four wings, meeting together in a hall 70ft. square, and 208 bedrooms will be provided. The cost of the building will be £33,850.

The very large block of the Gaiety Hotel and Theatre was almost completed



Foundation Work for the Waldorf Hotel, Aldwych, London.
A. Marshall Mackenzie and Son, Architects.

by the end of the year. Mr. Norman Shaw was associated with Messrs. Ernest Runtz & Ford in the design of the elevations.



David Lewis Workmen's Hostel and Club, Liverpool.
J. Francis Doyle, Architect.



Ingram House, Stockwell Road, London. Arthur T. Bolton, Architect.



New Head Office for Norwich Union Life Insurance Society.
G. J. and F. W. Skipper, Architects.



Mersey Dock and Harbour Board Offices as they will appear when completed.
Briggs and Wolstenholme, F. B. Hobbs and Arnold Thornely, Joint Architects



Selected Design for Manchester Stock Exchange. Bradshaw and Gass, Architects.

Close by the Gaiety
Waldorf and Ritz Hotels.
work for another
large hotel—the Waldorf—was
carried on, while at the Ritz
Hotel in Piccadilly remarkably
quick erection of the steel frame-
work was witnessed (Messrs
Waring White Building Co.,
Ltd., contractors).

The Municipal
Market Hall at
Leeds was opened
on July 2nd. It is 245ft. by 102ft.,
surrounded by eighteen shops
and an hotel. Cost £120,000.



Interior, Manchester Stock Exchange.



New Station, Midland Railway, Nottingham.
Charles Trubshaw, Architect.



Selected Design for Liverpool Cotton Exchange.
Matear and Simon, Architects.



Municipal Market Hall, Leeds. Leeming and Leeming, Architects.



Foreign Flower Market, Covent Garden, London.
Lander, Bedells and Crompton, Architects.



H. Saxon Snell.



Barrow Emanuel.



G. H. Birch.



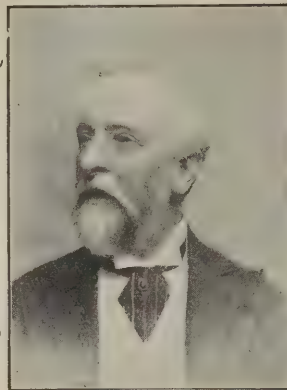
John Pethick.



Dr. A. S. Murray.



Professor Kerr.



John Norton.



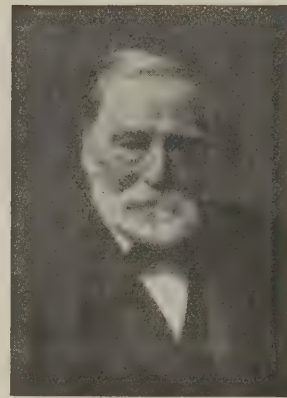
Francis W. Bedford.



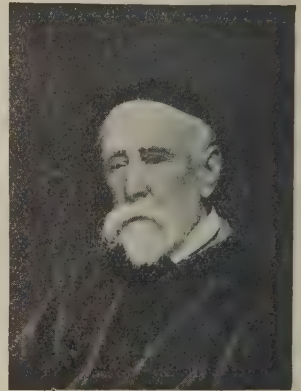
Richard Mawson.



Peter Paul Pugin.



B. T. Batsford.



G. F. Watts, R.A.

OBITUARY, 1904.

Obituary.

On January 4th Mr. H. Drury, architect, was found dead on the South-Eastern Railway line near Blackheath, having been apparently run over by a train. He was only 27 years of age. His father is district surveyor for Westminster.

Mr. H. Saxon Snell, F.R.I.B.A., well known as a hospital and infirmary architect, died on January 10th, aged 74.

On February 14th Mr. Barrow Emanuel died, aged 62. He was partner in Messrs. Davis & Emanuel, the well-known firm of City architects.

Mr. P. Gordon-Smith, late architect to the Local Government Board, died in February, aged 64.

Mr. William Millar—author of the standard book on plastering—died on February 27th, aged 64.

Dr. A. S. Murray, Keeper of Greek and Roman Antiquities in the British Museum, died on March 5th, aged 63. He was a great authority on Greek and Roman art and architecture, and the author of several manuals on

the subject, including one on the sculptures of the Parthenon.

Mr. Peter Paul Pugin, architect, of the firm of Pugin & Pugin, died on March 10th. He was the eldest son of the celebrated Welby Pugin and executed a great deal of church work.

Mr. John Pethick, head of Messrs. Pethick Brothers, the well-known firm of contractors, died on March 31st from injuries sustained in a carriage accident. He was 76 years of age.

Mr. G. H. Birch, F.S.A., died on May 10th, aged 62. He had been curator of the Soane Museum in Lincoln's Inn Fields since 1894, having succeeded the late Mr. Wyatt Papworth. His place was filled by Mr. Walter L. Spiers.

Mr. G. F. Watts, the great painter, died at the beginning of July.

M. Bartholdi, the celebrated French sculptor, died in Paris on October 4th, aged 72. His most famous works are the statue of "Liberty enlightening the World" at the entrance to New York Harbour and the "Lion of Belfort" in the Place Denfert-Rochereau, Paris.

Mr. Robert Kerr, F.R.I.B.A., Fellow and Emeritus Professor of King's College, London, and for forty-two years district surveyor of St. James's, Westminster, died on October 21st, in his eighty-second year. He was the first president of the Architectural Association, and did a considerable amount of professional work. He also published several books, including "The Consulting Architect" and the third edition of "Fergusson's History of Modern Architecture."

Mr. H. R. Gough, F.R.I.B.A., for two years president of the Society of Architects, died on November 6th.

Mr. B. T. Batsford, the well-known architectural book publisher, died at the beginning of November, aged 83 years.

Mr. John Norton, F.R.I.B.A., a past-president of the Architectural Association, died in November, in his eighty-second year.

Mr. Francis W. Bedford, A.R.I.B.A., died in December. Though only thirty-eight years of age, he had done work of much ability in conjunction with Mr. Kitson, of Leeds.



Nos. 10 and 11 Park Place, St. James's, London.
Alfred H. Hart and P. L. Waterhouse, Architects.



Cottages, Neston, Cheshire.



House, Wolvesnewton, Mon. A. Jessop Hardwick, Architect.



"Westmead," Thornton Hough, Liverpool.
Gilbert Fraser, Architect.



Queen Alexandra's Court, Wimbledon.
Ernest George and Yeates, Hon. Architects.

for the buildings, and Mr. C. E. Lancaster Parkinson undertook the direction and supervision of the work.

At the "Hay" memorial cottage homes in Naunton Park, Cheltenham, commenced in 1899, new cottages and washhouses were



Hay Cottage Homes, Naunton Park, Cheltenham.
Healing and Overbury, Architects.

erected according to the design of Messrs. Healing & Overbury.

At Chipping Ongar, Essex, the erection of homes for 300 children was begun by the Hackney Board of Guardians, from designs by Mr. W. A. Finch. The contract is being carried out by Messrs. McCormick & Sons, and amounts to £45,000.

A commencement was made with the enlargement of Victoria Station. An office block is to be built as an annexe to the Grosvenor Hotel, the ground floor being reserved for station purposes, waiting-rooms and a new booking-hall 120ft. by 70ft. The eight additional acres of land acquired by the railway company were cleared, and the new station

and boundary wall in Buckingham Palace Road practically completed.

At Nottingham, early in the year, the new Midland Railway Station was opened.

Royal Horticultural Society's New Hall.

The new hall and offices of the Royal Horticultural Society in Vincent Square, Westminster, were opened in July by the King. The cost of the building was nearly £40,000, Mr. Edwin J. Stubbs being the architect. The exhibition hall measures 142ft. by 75ft., and, with the two annexes opening into it, each 47ft. by 24ft., gives a total floor space of nearly 13,000ft. super. The roof is of glass.

Competitions. For the Liverpool Cotton

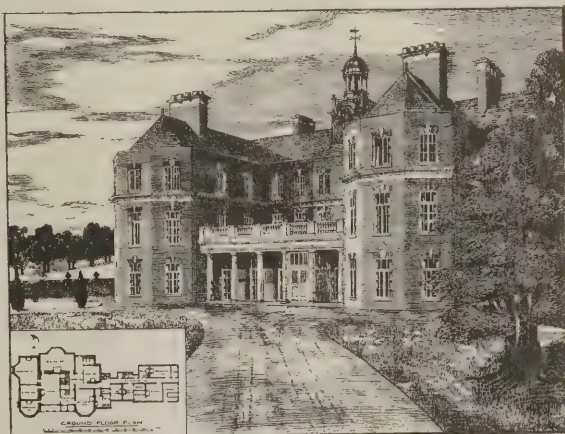
Exchange competition twenty-four sets of plans were submitted. Messrs. Huon Matear & Frank Simon, of Liverpool, were selected. The Exchange will be erected in Old Hall Street and is estimated to cost £150,000.

A competition was held for a new hall, library and museum at Eton to be erected as a memorial to Old Etonians who fell in the South African war. Sixteen sets of designs were submitted, those by Mr. L. K. Hall being awarded

the first premium of £100. Mr. Norman Shaw was the assessor.

A competition for a new public library at Peterborough was held, Messrs. Hall & Phillips, of London, being awarded the first premium.

An important competition was held for the Wesleyan House proposed to be erected on the site of the old Aquarium at West-



"Porters," Shenley, Herts. C. J. Harold Cooper, Architect.

minster. Over a hundred architects submitted sketch designs, and nine of the competitors were selected by Sir Aston Webb (the assessor) to send in designs in the final competition, each competitor to receive an honorarium of one hundred guineas.

A limited competition for new schools at Kingston-on-Thames was won by Mr. F. W. Roper.

The R.I.B.A. at last, after it had been advocated for many years, appointed a Committee of Defence to watch legal decisions and enactments, and advise members upon points of difficulty.



Almshouses, Bidston, Liverpool. Woolfall and Eccles, Architects.

The new Victoria Station.

Departmental Committee on Workmen's Compensation.

The departmental committee appointed to investigate the question of workmen's compensation issued their report in August. They recommended that the limitations in respect of employment on, in or about any building as regards height, use of scaffolding and employment of machinery should be repealed; that section 4, relating to sub-contracting, should be amended; and "engineering work" extended so as to include road-making and mending, well-sinking and repairing, and other excavation.

The Chantrey Bequest.

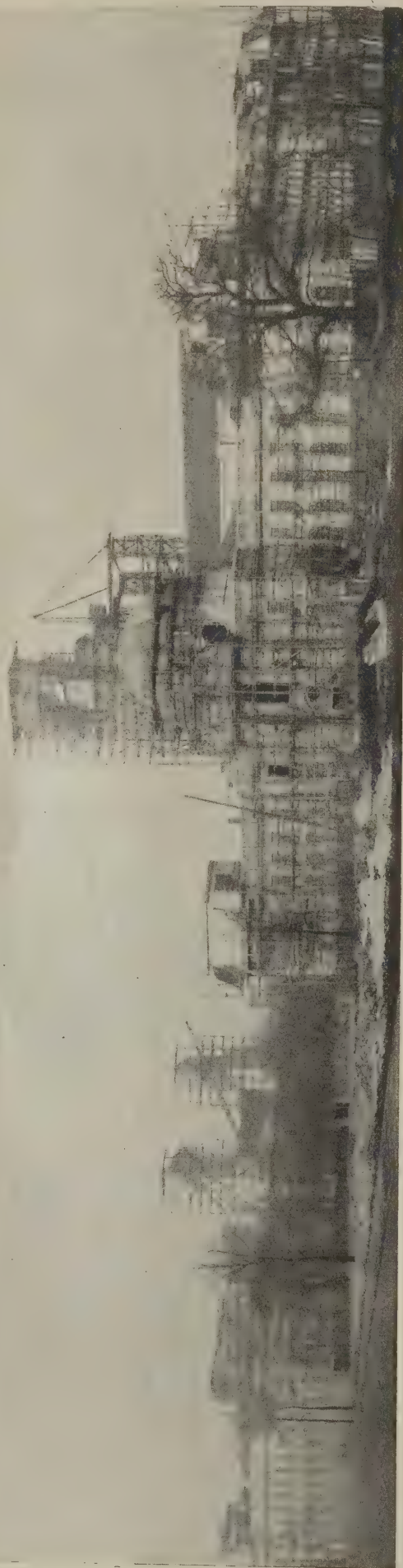
The Select Committee of the House of Lords appointed to enquire into the administration of the Chantrey Trust issued their report in August, recommending sweeping changes which amply justified the demands for reform made by critics. The Committee proposed to take away the power of purchase from the president and council of the Royal Academy, and to vest it in a committee of three, consisting of the president, an R.A. nominated by the council, and an A.R.A. nominated by the body of Associates. In addition, they advised that purchases should be made not only from exhibitions but from studios, private owners, sales and even from dealers.

Architects' Registration.

After being discussed for many years, the cause of architects' registration was forced on the Institute, who appointed a committee to obtain opinions from all quarters and report on the matter to the Council. This committee was appointed early in the year, and latterly there seems to have been some doubt of its working, by reason of the fact that when the Council elections took place in June, twelve of the former body who did not favour registration were displaced by younger members in support of it: the Council election, in fact, was fought on this basis and the result was the present pro-registration body. Pending the issue of the special committee's report, general discussion of the scheme has been withheld, though constant utterances at meetings of allied societies show that the provinces are decidedly in favour of registration. In any case, the year 1904 is likely to be notable for the prominence given to this important matter, and particularly for what is virtually a breaking-down of the Institute barriers. The Society of Architects' Bill was again introduced into Parliament, but made no further progress. Despite the arguments raised against the movement, it is more wide-spread now than ever before, and there seems every indication that it will be pushed to a conclusion, next year perhaps.

Rural By-laws.

The harmful effect of the rural by-laws upon cheap housing for the working classes attracted much attention during the year. Mr. Walter Long received a deputation headed by Sir William Grantham, and promised to give earnest consideration to the matter with the object of seeing whether further changes could be made which, while not destroying the sanitary conditions for houses in



the country, would avoid the needless trouble and expense now suffered. Sir William Grantham's case with the Chailey Rural District Council also attracted wide attention.

Architects' Drawings.

The decision in the case of *Gibbon v. Pease*, given in December, resulted in the R.I.B.A. and the Surveyors' Institution voting £100 and the Society of Architects £50 in upholding the appeal which is to be made against such decision. The judgment that an architect should be required to give up his drawings, specifications, &c., after a job has been completed is one which is totally unfair to the profession. These documents should be considered as his stock-in-trade, the means whereby his ideas are carried into effect, and as such the law ought to hold that the client has no right to claim them.

Personal.

Sir Henry Tanner, principal architect to the Office of Works, and Sir George Donaldson (who has done great service in connection with our national art collection at South Kensington) received knighthoods as birthday honours at the end of June.

Sir Aston Webb was knighted in November.

Out of six architects named by the president of the R.I.B.A. at the request of Lord Windsor, Mr. J. J. Burnet, was selected to prepare designs for the additions to the British Museum.

Mr. D. J. Ross, the City engineer, resigned his position owing to ill-health, retiring on a pension of £550 a year.

Mr. T. J. Bailey, architect to the London School Board, who had been in their service for thirty-two years, was transferred under the new Education Act to the London County Council, and now occupies the position of architect to the Board of Education.

M. Rodin received a very hearty reception when he came over to London in January, and his great figure of "Le Penseur" overshadowed everything at the New Gallery.

The Society of British Sculptors was formed, including Mr. Brock, Mr. Frampton, Mr. Pomeroy, Mr. Drury and other leading men.

Early in the year Mr. C. H. Reilly, M.A., A.R.I.B.A., was appointed to the Roscoe Chair of Architecture at Liverpool University, left vacant by Prof. F. M. Simpson on his appointment to University College, London.

Mr. Andrew Murray, F.R.I.B.A., retired from the City surveyorship in May, Mr. Sydney Perks being appointed, in December, to the position.

Mr. Felix Clay was appointed architect to the Board of Education.

In March the Glasgow Institute of Architects gave a complimentary dinner to Mr. John Honeyman, R.S.A., on his jubilee of fifty years' practice in the city.

Mr. William Glover made a further donation of £1,000 to the Northern Architectural Association.

LANCHESTER STEWART AND RICKARDS, ARCHITECTS.
THE ERECTION OF CARDIFF TOWN HALL AND LAW COURTS.



New Premises for the Ecclesiastical Commissioners, Westminster. W. D. Caröe, Architect.

Local Government Board's Offices.

At the bottom of Whitehall the huge block for the Local Government Board has been rising slowly amid a forest of scaffolding. At present it is up to the third storey. The building is not expected to be ready before 1907, and the contract of Messrs. Spencer, Santo & Co. is for upwards of £400,000, exclusive of fittings, plumbing and plasterwork. The late Mr. Brydon designed the building, and it is being carried out by the Office of Works under the direction of Sir Henry Tanner. The feature of the interior is the great circular courtyard, which will be 164ft. in diameter. At present, however, only half of it is being built.

In Whitehall very considerable progress was made with the erection of the new War Office, and by the end of the year work was well advanced on the towers at each side of the main frontage. The building is expected to be completed in 1906. Some idea of its size can be gained from the fact that the contract of Messrs. Foster & Dicksee is for £447,000, while the total cost with fittings will amount to about £650,000. The original architect was the late Mr. William Young, whose work is being carried to completion by Sir John Taylor and Mr. Clyde Young.

At the First Garden City, near Hitchin,



Constructing Reservoir for Garden City.



Plan of the First Garden City, near Hitchin.

the reservoir was constructed (Mr. G. R. Strachan, engineer), road-making work was continued, and some cottages were erected.

The design of Messrs. Dodd & Dodd, civil engineers, of Birmingham, for a new bridge across the Medway at Aylesford was awarded the first premium of £100 in a competition for which twenty-eight sets of plans were submitted. The total cost of the bridge is estimated at £37,000.

London Bridge, after having been partially closed for about eighteen months while the widening was being carried out, was re-opened on March 28th. The width of the bridge was extended from 53ft. 5ins. to 65ft., the close parapets removed and open balustrading substituted, at a cost of £100,000. The additional width is carried on steel joists and granite corbels.

The proposal to rebuild Lambeth Bridge at a cost of £872,000, replacing it by a steel structure 60ft. wide on granite piers, was referred back by the London County Council.

The scheme for the reconstruction of Southwark Bridge by lowering the crown and filling up the approaches was abandoned after considerable discussion. One wonders what the Corporation will next propose. As it exists, the bridge is of very little use on account of the gradient of its approaches, but it ought nevertheless to form a valuable artery out of the City. We expect the new scheme will be for a viaduct, as this would seem the only possible alternative to a new bridge.

At the delightful little village of Sonning, near Reading, the old timber bridge across the Thames was replaced by one of lattice-girders to take the heavy traffic—traction engines, road rollers, &c.—between Oxfordshire and Berkshire. The bridge was the subject of much discussion, as it was felt that the change would spoil the appearance of the place. In reality, however, this has not proved to be so, the design of the new bridge being satisfactory, with the exception of the piers.

Considerable attention was directed to reinforced concrete during the year. A new ferro-concrete jetty for landing refuse was constructed at Purfleet on the Hennebique system by Mr. L. G. Mouchel. Part of it consists of a bow-string girder bridge entirely of reinforced concrete.

The last stone of the Folkestone Harbour extension works which, begun in 1896, have been carried out by the South-Eastern and Chatham Railway Co. at a cost of £500,000, was laid by the French Ambassador on July 12th.

At Menai the well-known suspension bridge by Telford, which had shown considerable signs of weakness, was strengthened by steel wire ropes and stiffening girders, and a footway formed outside the bridge proper.

Good progress was made with the new promenade at Blackpool under the direction of Mr. J. S. Brodie, the borough surveyor. The work was



South Kensington Museum Extension. Sir Aston Webb and E. Ingress Bell, Architects.



Local Government Board Offices, Whitehall, London. The late J. M. Brydon, Architect.

commenced in May, 1903, and when completed will have cost £350,000.

The 73 miles long aqueduct from the filter beds in the Elan Valley to the service reservoir at Frankley, 7 miles from Birmingham, for that city's water-supply from Wales was completed in July. It consists of 13½ miles in tunnel, 23 miles in cut-and-cover conduits and 37 miles in pipe syphon. Mr. James Mansergh was the engineer. The total cost will be about £6,000,000.

After being under construction for four years the new graving dock at Hebburn, Durham, was completed for Messrs. Robert Stephenson & Co., engineers and shipbuilders. It is the largest dock on the north-east coast, its chief dimensions being: length 700ft., width at caisson 90ft., and at coping 111ft. The cost was £250,000. Messrs. McAlpine & Sons, of Glasgow, were the contractors.

At Teddington the new lock was opened on June 11th. It was under construction from March, 1901, and cost £28,000. The length is 650ft. and the width 25ft.



Menai Suspension Bridge.



Sketches on the A.A. Tour.



Transporter Bridge, Newport, Mon.



New Bridge across the Thames at Sonning.

SOME ENGINEERING
WORKS.



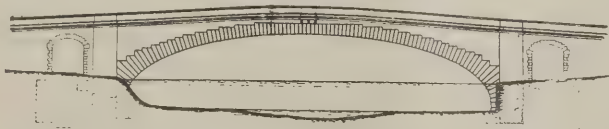
Ferro-concrete Pier at Purfleet. L. G. Mouchel, Engineer.



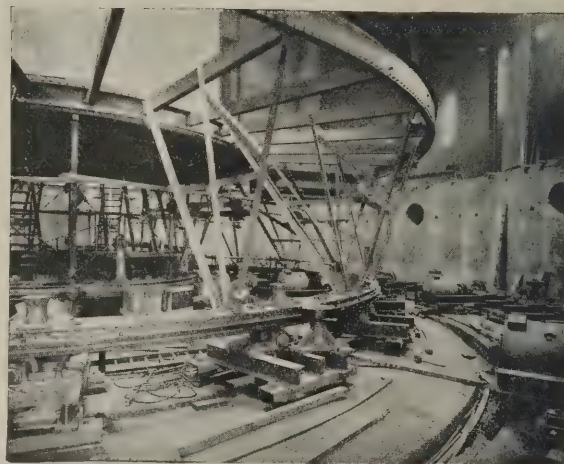
Base of Tower, Transporter Bridge, Newport.



London Bridge, as Widened. Andrew Murray, Architect. E. Cruttwell, Engineer.



Selected Design for Aylesford Bridge. Dodd and Dodd, Engineers.



The Revolving Stage at the London Coliseum.
E. Wingfield Bowles, Engineer.



New Dock at Hebburn-on-Tyne.



New Lock at Teddington, on the Thames.



ERECTION OF THE LIVERPOOL DOCK OFFICES: CONDITION OF WORK ON OCTOBER 27TH, 1904. WILLIAM BROWN & SONS, BUILDERS.

New Bridge over
the Exe.

Work was begun on the erection of a new bridge across the Exe at Exeter, from the design of Mr. C. A. Brereton. This will be somewhat of a novelty, for the arch, instead of the usual ellipse, will be a parabola, steel girders from either side meeting in the centre and being there hinged together, thus allowing for expansion and contraction by the rise and fall of the centre, instead of variation in the length of the bridge.

Transporter Bridge
at Newport.

At Newport, Mon., the steel towers of the transporter bridge were erected on either side of the river. These are 241ft. high, the span being 645ft. and the height from high-water mark to underside of stiffening girder 177ft. Along this girder will run the elevated traveller (carried on sixty wheels arranged in pairs) from which the car is suspended, being 33ft. in length by 40ft. in width and capable of conveying a number of vehicles and passengers. The car will be able to carry a load of sixty tons, with accommodation for 500 passengers, and will be worked by an endless rope driven by electric motors. The trip across the river will occupy about one minute. The total cost, including land and approaches, will be £95,000. The engineers are Messrs. Arnodin and Robert H. Haynes.

A new pumping station was erected in Lot's Road, Chelsea, by the London County Council to deal with storm water, which formerly choked the sewers and overflowed the surrounding districts. The cost of the station was £82,000. Gas engines were selected for the power, as being most economical in view of the necessarily intermittent character of the pumping, which is expected to be only for about sixty-three hours per year.

The Liverpool
Dock Offices.

The new Dock Board Offices at Liverpool is being erected on the landing stage. The general view on this page shows the high derricks on their timber piers, the steel skeleton of the central hall and dome towering out of the white Portland stone. Many floors have now risen above the street level. One is impressed by the open site—a site that few buildings obtain and that few architects have the good fortune to place

their work upon. Every kind of machine is at work on the stone—so many that it is difficult to understand where the three hundred masons (who form such an interesting picture when looked down upon in the photograph on this page as they chisel away in the old dock below) find work for their willing hands. It will be several years before this large monumental building is completed. Messrs. William Brown & Sons, of Manchester, are the contractors.



YARD, SHOWING 300 MASONS AT WORK.



New Theatre Royal, Birmingham. Ernest Runtz and Ford, Architects.

In London important theatre work was carried out during the year. Among the new theatres are the Coliseum in St. Martin's Lane (Messrs. Frank Matcham & Co., architects) and the Scala in Tottenham Court Road (Mr. Frank T. Verity, architect). At the Coliseum the great feature is the revolving stage, said to have cost £12,000.

The Savoy Theatre was re-decorated, new staircases and exits provided and a new hot-water system installed. The Lyceum Theatre was altered into a music-hall. Drury Lane Theatre was extensively overhauled, and the Haymarket Theatre reconstructed.

At the Lyric Theatre, Shaftesbury Avenue, and the Shaftesbury Theatre Mr. Robert Adams, of Holborn, supplied fittings, including panic bolts of a unique pattern which enable swing doors to be opened simultaneously. He also supplied special gearing for the movable roofs over the stages at "His Majesty's Theatre" and the London Coliseum, besides window-opening gear to many other important buildings, including the Royal Horticultural Society's new premises, the Mount Vernon Hospital at Northwood, Messrs. Robinson & Cleaver's new premises, the R.F.A. new barracks at Whitehill (Hants), &c.

New Theatre Regulations.

New rules were approved by the London County Council with the view of minimizing the risk of fire or panic in theatres. These forbid overcrowding and standing or sitting in gangways, and provide that the seating area assigned to each person must not be less than 2ft. deep and 1½ft. wide in any part of the house, and that there must be a space of at least 1ft. in depth between the front of one seat and the back of the next. All scenery, wings, draperies, floral decorations, hangings, &c., must be non-flammable.

Provincial Theatres.

In the provinces the chief new theatre built during the year was the Theatre Royal, Birmingham (Messrs. Ernest Runtz & Ford, architects), which was opened in December.

At Ayr the Gaiety Theatre was reconstructed under the direction of Mr. Alex. Cullen, F.R.I.B.A., and at Glasgow the King's Theatre was completed from Mr. Frank Matcham's designs.

Miscellaneous.

An ingenious machine for the automatic reproduction in stone or marble of modelling and sculpture was introduced by the Automatic Sculpture Syndicate, Ltd., of 62 and 64, Sumner Street, Southwark, S.E.

Messrs. Adamsez, Ltd., carried out sanitary work during the year at a large number of important buildings, among which may be mentioned the Royal Deaf and Dumb Asylum, Margate; Technical School, Eastbourne; new barracks at Tidworth; new County Court Buildings, Leicester; Ipswich Hospital;

Luton Workhouse; new barracks, Shotley Point; Soldiers' Home, Chatham; several public conveniences, and numerous schools and Government post-offices.

A new drill hall and gunshed at Lancaster, for the 5th L.R.G.A., was erected from the design of Messrs. Harrison, Hall & Moore, the roof work having been carried out by Messrs. E. F. Blakeley & Co., of Vauxhall Ironworks, Liverpool, who also manufactured and erected constructional steelwork for generating stations and car sheds in various towns. A novel hospital lined with asbestos cement sheets, instead of matchboarding, was also erected at Galashields by this firm.

At the Leeds Public Dispensary a new electric lift was installed by Messrs. R. Waygood & Co., Ltd.

The "Otis" electric elevator installation in the Savoy Hotel extensions will be the largest electric elevator installation, both in point of number and capacity, in any hotel in this country. The service (apart from the powerful "Otis" hydraulic elevator installation in the old hotel block) will comprise seven electric passenger elevators, four freight elevators and ten service elevators.



New Gates at Worsley Hall.

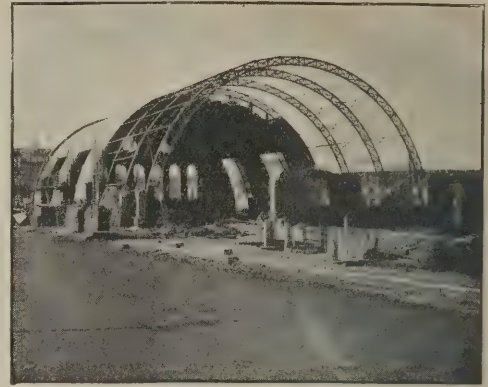
Messrs. George Wragge, Ltd., of Manchester, erected the new gates and railings to St. John's Gardens, Liverpool, and the gates at Worsley Hall (for the Earl of Ellesmere), illustrated above.

In the Savoy Hotel extension the hot-water system and a large amount of work in connection with the cold-water service was carried out by Messrs. Burn Brothers, of 23 and 24, Charing Cross, London, which firm opened additional warehouse and workshop premises at the Rotunda, 3, Blackfriars Road, S.E.

The Havelock Patent Plaster Partition of Messrs. Hodkin & Jones, Ltd., Sheffield and London, E.C., was placed on the market in the spring of the year.

A remarkable lightning conductor was fixed to the new chimney shaft at the Brighton Corporation Waterworks by Mr. Joseph Lewis, of 5 and 6, Great Winchester Street, London, E.C.

Canadian veneered hardwood doors, which successfully overcome warping and twisting and secure the effect of the most beautiful and dearest woods at a minimum of cost, were introduced into this country by the Gilmour Door Co., Ltd., of Trenton, Canada, and 53, Berners Street, London, W.



Drill Hall at Lancaster.

Messrs. Diespeker, Ltd., of London, laid their mosaic in a large number of buildings, including the London Hospital, Tunbridge Wells Hospital, Napsbury Asylum, Hollymoor Asylum, Southern Hospital (Carshalton), Highfield Infirmary, Theatres Royal at Halifax and Birmingham, Midland Hotel, Manchester, "Scotsman" buildings, Edinburgh, Hull School of Art, &c., &c.

Several large buildings in the city were completed, including the new premises for the Royal London Friendly Society, in Finsbury Square (Mr. John Belcher, architect), new premises for the Liverpool and London and Globe Insurance Co. facing the Mansion House (Mr. J. Macvicar Anderson, architect), and new premises for the London and Provincial Bank, in Princes Street (Mr. A. C. Blomfield, architect).

Messrs. W. B. Wilkinson & Co., of Fulham, executed interesting concrete work at the Royal Mews, Buckingham Palace, and at Tondridge Court, Oxted.

Messrs. Craven, Dunnill & Co., of Jackfield, Shrops., completed a large tiling contract at the Southern Isolation Hospital, Carshalton, Surrey, for the Metropolitan Asylums Board under Messrs. Treadwell & Martin, architects. This hospital will be the largest of its kind ever carried out by the Board. Lavatories, bathrooms, kitchens and mortuary have been lined with glazed tiles in the most approved manner. Two other similar contracts were completed by Messrs. Craven, Dunnill & Co. at the Neasden Hospital, Middlesex, and the Inebriates' Home at Langho, Lancs. This firm also carried out extensive tile work for floors and walls at the Lady Forrester Convalescent Home at Llandudno, and in the hospital at Wenlock, under Messrs. E. B. I'Anson & Son, architects.

"Uralite" has among the host of new materials won a prominent place owing to its fire-resisting and hygienic qualities, low price and especial suitability for the erection of cheap, yet healthy and safe, cottages, sheds and other premises.

Steel roof-work for the Birmingham University buildings was executed by Messrs. Hill & Smith, of Brierley Hill Ironworks, Staffs.

At the new Chesterfield Infirmary the heating installation was carried out by Messrs. Stanley Sheen & Co., of Sheffield.



Boilers at Chesterfield Infirmary.

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